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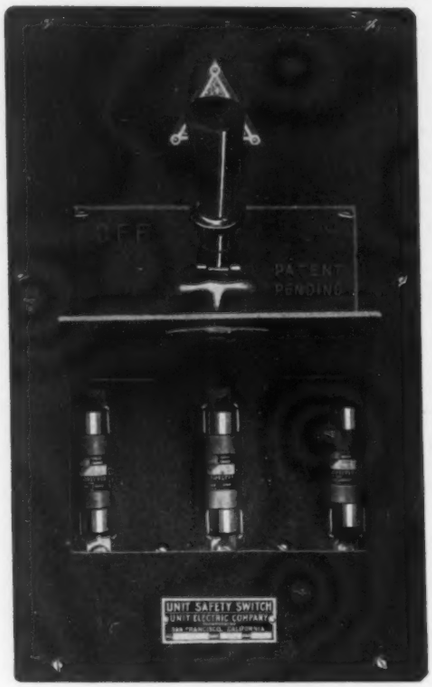

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COOPERATION IN THE WEST

Cooperation has accomplished the saving of millions of dollars annually for industries of the West through the installation of improved systems of distribution which has meant a better price to the farmer and a lower price to the consumer. The efficient organizations built up by these cooperative associations have spread the fame of their product to the far corners of the world by means of extensive advertising accompanied by the finest examples of lithographing that it has been possible to obtain. Due to this magnificent effort "Hood River" apples, "Sunkist" oranges, "Diamond Brand" walnuts and "Sunsweet" prunes have become bywords in every American home. One of the finest examples of this work is that done by the California Associated Raisin Company, packers of the "Sun-Maid" raisins. These products brought largely to life by electrical pumping have increased the value of the land from fifty to twelve hundred and fifty dollars an acre and the value of products has increased accordingly.

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Journal of Electricity and Western Industry

A publication devoted to the upbuilding of the great industrial West and the countries bordering on the Pacific

A McGraw-Hill Publication

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Interpreting Western progress through the application of electric power, light, and heat in industry and in the home

Vol. 46, No. 8 SAN FRANCISCO, APRIL 15, 1921 Per Copy, 25 Cents

What Is the Conclusion of the Whole Matter

IN this empire of the Pacific and Mountain states the vision of "Westward the course of Empire takes her way" was never more evident to the world at large than it is at the present moment, and it is well for us to look inwardly to see what there is of constructive thought toward a helpful solution of present-day problems in this western vision that we are giving to the world today. The American government is fundamentally founded on the principle of fair play for every individual citizen and in this district of our nation this principle has been acknowledged in the business as well as the personal field, so that we are ready to recognize, when once the value of service has been established, that a reasonable and fair return on that service should immediately follow. This is the fundamental, basic fact today in the development of progress in the West. You may call it "fair play," we call it "cooperation." Turn through these pages of the Journal of Electricity and Western Industry and note what this principle of cooperation has done in the Raisin Industry in Central California and in the California Fruit Growers' Exchange in Southern California, what it has done in the Wheat Growers' Industry of the Northwest, and what it has done in the Electrical Industry throughout this entire western empire to make it the foremost effort of its kind in the world today. Opportunities in industrial advancement, in power development, in electrical sales, and indeed in every line of human effort today require again those qualities of salesmanship, inborn in the West, but which have been lying dormant now for a five-year period; but in the light of the knowledge which cooperation has brought us, it is well to remember that the day for "bunk" has passed. The opportunity to slip something over, if it ever did have its day, will never come again, and out and out qualities of truthful service expressed in honest efforts at salesmanship will alone bring results.

It would seem, then, that the time has come for even greater cooperative effort in the West. A master organization must be formed embracing all industry. Due to the gigantic problems of finance involved in the present seven hundred and fifty million-dollar water power development program in the West, the electrical industry might well take the lead in promoting such an organization. But there are other mighty problems that must be solved. Freight rates and transportation, credits, selling support and general business problems with that of utility regulation in the foremost, are, too, discussions of vital moment to all industry in the West. The Chambers of Commerce of the West might well be called upon to take the lead in such an organization, but if they are lax or indifferent in this pressing duty we must proceed without them and place our support in an organization of our own creation.

The Del Monte Convention of the Pacific Coast Section, N. E. L. A., will this year set aside Friday, June tenth, for a Pacific Coast Conference of far-reaching importance, to which conference leaders in every branch of industrial and commercial development in the West will be invited.

The conclusion of the whole matter is then if you are really and truly on the square and want only fair play, a fair return in all industry with open, frank and above-board treatment from the public at large, if you are interested in the building of a greater, more opulent West which will loom more and more distinctly upon the horizon of the business world, be ready at this Conference to voice your sentiments and to create an organization that will in months to come prove a power in the industrial, commercial and electrical life of the West.

Regulation vs. Competition in the Northwest

According to a recent telegram from the Northwest, a movement has been started to invoke the referendum on the so-called "Certificate of Necessity and Convenience Act" passed by the last Washington legislature. This act, as finally adopted in 1920, represented the hard-fought victory of those who believe in commission regulation rather than competition as the best safeguard for public interests in securing adequate and economic service. It brought to Washington the policy which has long been established under California rulings—that of requiring the consent of the regulating commission before a public utility may enter the district already served by another company. The idea back of it is that duplication of equipment and personnel in the end must be paid for by the public, either in supporting two successful companies, or in higher rates paid to the company which wins out by purchasing the other.

The principle of recognizing the natural monopoly of public utility concerns so long as they render adequate and reasonable service has proved its worth in practice and in California at least, after nine years in use, may be regarded as established. It is significant that the recent investigating committee from the California State Legislature who started their inquisition of the Railroad Commission of that state

with the avowed disapproval of this principle, were completely converted by their investigations and express this stand in their final report:

> "Competition in public utility service is fundamentally wasteful. A territory well served (conceding that regulation regulates and compels good service by any utility, cannot be better or more economically served by two or more utility concerns."

And in another place they state that, in the absence of public ownership, the committee "is of the opinion that . . . the only solution of the problem is through regulated monopolies."

The Journal of Electricity and Western Industry considers this principle the foundation stone of successful regulation. It is greatly to be hoped that the efforts to retract this forward step in Washington will not prove successful.

Standardization of Plugs and Wires

Notwithstanding the magnificent advance of the electrical industry, particularly in the Far Western states where the per capita use of hydroelectricity is six times that prevailing in other sections of the nation, the people of the West are throwing a bomb shell into the electrical industry, and it is well not to overlook the full meaning and significance of the complaints that have been brought out in various hearings before legislative investigating committees in recent weeks. When all is said and done, the outstanding objections have largely arisen from a misconception on the part of the public concerning electrical terms, uses and applications. The public cannot get the meaning of the simplest technical terms without long and painstaking explanations, and when it comes to trying to explain to the public the why of the thousand and one different types of plugs, fittings and wires for the modern home electrical with the gorgeous array and the conflicting and perplexing situations that arise in their use in the home due to a gross lack of standardization, no amount of explanation can make the public believe that the electrical industry today has a united and broadly cooperative front, so far as helpfulness to the public is concerned.

A hint to the wise is sufficient. Come then, you electrical manufacturers; you must, for the sake of the welfare of this great industry of ours, get together on some broad basis of standardization for the uses of plugs and wires and receptacles of various types in the home electrical, and do it now. Too long has this been a matter of indifference in our industry.

The Why of Forest Preservation

Members of the electrical industry throughout the West will be tremendously interested in following the reasoning of W. B. Greeley, Chief Forester of the United States, who addressed some five hundred men gathered at the San Francisco Electrical Development League recently at the Palace Hotel.

Mr. Greeley, himself a product of the West, radiates the enthusiasm, the spirit and the newness of life so characteristic of the West. He drove his point home forcefully to his audience when he called attention to the fact that carefully compiled statistics for the Chicago district today show that building operations in and about Chicago must pay a toll of twelve dollars a thousand for lumber, due to the depletion of the forests within two hundred miles of Chicago, which formerly furnished the building material for the great mid-continent city. This could have been entirely avoided if the preceding generations had taken proper steps to reforest as the work of timber cutting progressed. He forcefully called attention to the fact that the West today has within its borders wonderful storehouses of timber for the nation, and while he advocates the cutting of this timber as the needs of industry require, still at the same time he cited the Chicago instance to drive home the point that the West must take full precaution in the cutting of its timber lands, to see to it that the next generation in the West does not suffer as does the present generation in the Chicago district.

Five Major Considerations

In viewing in a broad way the problems now before the electrical industry throughout the West, the situation may well be summarized in five leading outstanding features. In the first place, a lack of accounting method of cost keeping, particularly in the contractor-dealer branch of the industry, is still a problem that needs adjusting. This is being met by research work on the part of the University of California through a series of articles appearing now serially in the Journal of Electricity and Western Industry.

In the second place, the economic saving to be derived from proper installation of commercial lighting units in industrials is a problem of great interest in the West. This is being met by educational exhibits that are being put on in a number of the larger metropolitan districts of the West, particularly in San Francisco and Los Angeles.

In the third place, need for more definite advertising on the part of the contractor-dealer and also on the part of the central station in putting over the electrical idea and what the unlocking of hydroelectric resources of the West means to the people at large is quite apparent. There is much helpful activity going on in the various educational campaigns of a cooperative nature throughout the West that is helping to remedy this situation.

Fourth, the institution of ample convenience outlets in the home has long been recognized as the neck of the bottle, insofar as the greater utilization of appliances in the home electrical is concerned. As a consequence, the home electrical idea has been instituted in the West, and typical homes are being built and fitted up in a manner that is calling forth commendation from all sides. In California during the five months that these homes have been under way, over two hundred thousand people have visited them and the public generally has received a clearer, cleaner conception of just what the home electrical means, and the convenience outlet is making its

appearance to a far greater degree in the recently built homes now under way in the West.

And finally, the subject of hydroelectric development in its broadest aspects in relation to the growth of the West, is being carried home to the people more than ever before, due to the remarkable findings of the efficient state of utility development on the part of probe committees of various legislatures of the West, to such a degree that the public is learning in a way never before even approached, that as develops the hydroelectric industry so develops the West.

A Side Light on Prohibition

The Journal of Electricity and Western Industry is presenting no brief for or against prohibition on the grounds of its moral aspect, nor is it interested in the question whether the bootlegger or the prohibition agent is winning out. The question of what effect this extension of the dry season would have upon western business, however, was one which gravely concerned the entire region before the drought occurred—and the result after a year or more of experience seems worth checking up.

A questionnaire recently sent out to the power companies on this subject, the details of which are reported on another page of this issue, has yielded some interesting facts. The final judgment would appear to indicate that, irrespective of the leaks which may have developed in the enforcement of the act, business results as a whole have been favorable. The saloon, apparently, is not a desirable element in the community, even from the purely financial standpoint. It paid its bills promptly, but apparently, facing its competition, other legitimate establishments in the community did not. In the main, other business has already taken its place and the general level of the whole is counted as higher. The recent prosperity of the western vineyardist was one of the surprises of prohibition—and judging from these figures, the small effect from a business standpoint of the passing of the saloon and the distillery may well be regarded as another.

Municipal Membership in the N. E. L. A.

There has been considerable informal discussion of late as to the advisability of having an affiliated grouping of employes in municipal plants associated with the work of the National Electric Light Association. Certain sections of the nation take a rather decided attitude against such a move, on the ground that no common interests exist, or at least not sufficient to warrant a move of this nature. In the far western states, however, a decidedly different attitude prevails; particularly is this true in the Pacific Division of the N. E. L. A. At a recent conclave held in San Francisco, a large grouping of the engineering committees of the division met with representatives from municipal plants. It is needless to say that the technical discussions proved unusually helpful, due to the fact that additional angles of discussion were possible, and a certain breadth of vision developed that could not otherwise be brought out.

The dark secrecy characteristic of the Middle Ages has long since passed into traditional history, and present day exponents of utility evolution agree that the truth will out sooner or later. So confident are true leaders of the modern utility movement in the truth of their cause, that they fearlessly invite all types, kinds and groups of men into discussions devoted to the upbuilding of the industry.

Journal of Electricity and Western Industry is in full accord with this splendid viewpoint, so full of the enthusiasm and breadth of vision of the West.

A Good Word for the Electrical Industry

In the March 12th issue of Collier's Weekly appeared an editorial entitled "A Square Deal for Public Utilities," which is an example of the broad-minded support being given by this publication to the cause of good-will between the public and the public service industry. The concluding paragraph of the editorial states:

> "America will move forward, and the speed and comfort with which she moves will depend in large measure upon her ability to produce, at low costs, heat, power and light. Let each community give some thought to its public utility situation, to the end that we may more quickly give a square deal, not only to the hand that lights the gas stove or turns on the electric switch, but to the investment pocketbook which furnishes the capital as well."

It is an encouraging thing for the business stability of the nation that the right of a reasonable return on investment is thus recognized as fundamental. The average man, assuming that there is such a being, too often knows the problem in terms of his individual electric bill, and does not think of it from the broader business standpoint of the welfare and development of an entire district. Such constructive editorials as that published by this well-known weekly are of inestimable value in fostering a more enlightened attitude.

Gold Mining in California

Gold mining in California has contributed to the wealth of the United States since the "days of '49" to 1920, $1,720,496,203. For many years up to 1915, the average gold production of California was $20,000,000 per year. The industry is in the far distant parts of the state and does not attract general attention. Nevertheless, it is an important factor in the business prosperity of the larger communities, as over one-third of the annual gold production is expended for equipment and supplies, not to mention the proportion going directly into the hands of labor in the form of wages. Since the war the gold miner has been faced by increasing costs, and unlike many other industries, these increased costs cannot be passed along, due to the fixed price of gold. The direct result has been the shutting down of mines and a dwindling gold production. Production was only $13,000,000 in 1920. The decrease of $7,000,000 means a decrease

of $2,500,000 to manufacturing and trades people of California.

To remedy this situation the McFadden bill has been introduced in Congress, but has not yet been acted upon. The bill proposes an excise tax of $10 per ounce on all gold used in the arts. Gold is used for both monetary and industrial purposes. The bill is an attempt to secure equity for the gold producer insofar as his gold is used for industrial purposes. The amount realized from the excise tax is to go to the gold producer and will, to a certain extent at least, enable him to continue his development and operations. We believe that the gold industry is essential and necessary to the prosperity of our business and farming communities. The pending federal legislation is in our judgment wise and merits extended support. New life will be infused into the mining districts if it goes through, and new wealth that will benefit every industry in the state will be created.

The Problem of Electro-Chemical Rates

Some dissatisfaction with the rates for electric power in the electro-chemical industries is current in western centers, the complaint usually taking the form of criticism of rate regulation, which does not permit special rates to fit special conditions. Electric furnaces in the West, for instance, owing to the limited extent of the market, and the fact that it is impossible to reduce the size of the furnace below a minimum point, usually can operate at full load only for a very small proportion of the time. According to the rate provisions under which most of these concerns operate, however, they must pay on the basis of their maximum demand, however small a factor it may be in their total cycle. The result is that electric operation becomes unattractive and in most cases, out of the question.

The electro-chemical industry is a legitimate one for this region where raw materials are found in such abundance, and it is an important one from the standpoint of the basic products it makes available in the growth of the community. Its contention is that special provisions should be made in power rates to meet the special requirements of its conditions, and certain of its advocates even go so far as to condemn all rate regulation on the ground that it does not allow this.

This latter question is no longer open to discussion. Regulation of power companies has proved itself, and only in such naive circles as our state legislatures is its value still open to question. On the other hand there seems to be no doubt that in particular instances injustices have been worked out by the application of the universal rule, and the community has been deprived of a thriving enterprise which would have been to its advantage. It has been well pointed out that in the matter of railroad rates individual problems are taken into consideration and the burden so shifted between freight payers that industries and regions are permitted to develop in spite of what might appear to be the natural course of the law. In the matter of electric rates, a similar attitude has been taken on occasion toward the pioneer work to be done in agricultural regions, when, very frankly, the cities have been asked to bear more than their natural proportion of the costs of power production because of the advantages to them of the development in the back country. May it not now be the case that the electro-chemical industry deserves similar encouragement?

Electric range experience has shown that in operation the diversity factor materially lessens the amount of transformer equipment thought necessary. Is it not possible that the disadvantages of electro-furnace and similar loads have been exaggerated in the paper calculations in much the same fashion? A tremendous field of activity is awaiting the word of encouragement. Can the West afford not to open the door to this development?

The Motor Truck a Transportation Problem

In some parts of the West, inter-city motor truck transports have increased as much as 400% since the pre-war period and the effect of heavy traffic on highways has become a serious problem. It is not an uncommon sight to see trucks with as many as three trailers all heavily loaded, the combined weight undoubtedly amounting to several tons. Two oil tank cars such as are commonly used on railroads, fitted with tires, have been seen being towed along a macadam road.

The serious effect of such traffic upon the cost of highway upkeep is acknowledged by all concerned, but the situation produces different reactions in the remedy proposed, depending upon the angle of view. Legislatures are inclined to limit the weight of vehicles allowed on the highways. Truck manufacturers, on the other hand, point out the essential part which trucks have played in the development of such districts as the oil fields of the San Joaquin Valley—and urge the construction of better roads which will withstand heavy duty without deterioration. These roads cost money, however, and it does not seem right to tax all motor users of a highway to meet the needs of a special commercial group.

There is another viewpoint which neither side seems to consider in this discussion, and that is the element of unfairness to the railroads resulting from this competition. The truck owner has his track built for him at public expense and under present conditions is taxed only a nominal sum for its upkeep. It seems logical that he should stand the cost of wear and tear caused by the use of the road from which he derives a profit. A toll upon all freight-carrying or commercial passenger vehicles above a given size, based upon their weight, would have two benefits—that of furnishing a greater source of revenue for better highway construction or for the upkeep of present roads, and at the same time of placing the truck upon a more justly parallel basis with the railroad, which must pay for upkeep of its track. Unquestionably the truck is here to stay—but it should expect to pay its way in highway costs.

IMPORTANT AGREEMENT BETWEEN PACIFIC GAS & ELECTRIC CO. AND THE GREAT WESTERN POWER CO. OVERCOMES POWER SHORTAGE

Regulation of far-reaching constructive results has been brought about by an agreement between the Pacific Gas & Electric Company and the Great Western Power Company under which the Pacific company agrees to take from the Western company all its excess hydroelectric power at a price to be fixed by the Railroad Commission of the State of California. The agreement is the direct result of an order issued April 6, by Frank R. Devlin, president of the Commission, during the hearing of the application by the Pacific Gas & Electric Company for a continuation of a surcharge allowed by the Commission to enable the company to meet conditions created by the water shortage during 1920. The result of the order will be to place at the disposal of the Pacific company hydroelectric energy and enable it to dispense with the operation of costly steam plants.

According to Power Administrator H. G. Butler, who was present at the conferences between representatives of the Pacific Gas & Electric Company and its competitor, the Great Western Power Company, it was agreed that the Pacific company, to the extent of the present interconnections, is to take surplus hydro power from the Great Western Company in so far as it can displace steam power therewith. According to Butler it was the joint estimate of the two companies that during the remainder of the year 30,000,000 kilowatt-hours could be taken over the present interconnections. It was further estimated that the Great Western company would have an additional surplus of 28,000,000 kilowatt-hours.

"To utilize this additional surplus," said Butler, "the engineers of the companies have been instructed immediately to investigate and report upon the increased interchange facilities which may be needed to make available to the Pacific company this remaining Great Western hydro power to displace steam power. If the report of the engineers indicates that suitable interconnections can be made at a reasonable cost to transfer this excess of 28,000,000 kilowatt-hours the companies agree to make this expenditure and the Pacific company agrees to take this energy in so far as it can utilize it to displace steam."

Butler announced that it has further been agreed between the companies that the most efficient steam plants of both companies available and adequate for the purpose, will be operated on joint account for both companies, and that the operation of steam plants will be reduced to a minimum.

IMPORTANT SUMS OF MONEY AVAILABLE FOR WESTERN HIGHWAYS

Continued prosperity of the rural communities is, in a large measure, dependent upon the building and maintenance of highways over which the products of the soil and the mineral resources of the West may be made available to industry and to supply the urban population with food. A recent announcement by the Bureau of Public Roads of the Department of Agriculture lists the approximate amount of money available for road and bridge construction and maintenance during 1921. The total is 94½ million dollars, proportioned among the Western states as follows: Arizona, $8,000,000; California, $26,000,000; Colorado, $7,000,000; Idaho, $4,500,000; Montana, $8,500,000; Nevada, $3,500,000; New Mexico, $4,000,000; Oregon, $10,000,000; Utah, $6,000,000; Washington, $14,000,000; and Wyoming, $3,000,000.

PRODUCTION OF POWER BY PUBLIC UTILITIES IN WESTERN STATES IN 1920

A recently issued bulletin of the United States Geological Survey gives preliminary figures showing the production of power by public utility power plants in the United States for the year 1920. The total production for the country was 44 billion kw-hr., of which 27.5 billion kw-hr. were produced by fuels and 16.3 billion or 37.5 per cent produced by water power. In the ten Western states listed below, a total of 7.96 billion kw-hr. were produced of which 6.33 billion kw-hr. were produced by water power, or 81.8 per cent. This is indicative of the degree to which water power is utilized in Western states.

Power Production in Thousands of Kilowatt-Hours

	By Water Power	By Fuels
Arizona	106,527	52,672
California	2,568,541	1,148,968
Colorado	184,674	212,581
Idaho	580,210	1,886
Montana	1,118,905	7,111
Nevada	32,690	859
New Mexico	828	14,110
Oregon	370,867	104,676
Utah	212,195	78
Washington	1,154,135	42,590
Wyoming	2,271	44,453
Total,	6,331,943	1,629,984

COCOANUT OIL BROUGHT FROM ORIENT IN TANK SPACES

Edible oils and oils for the production of the better grades of soap are in demand throughout the country, although at present the market is quiet. The cost of transportation is a factor in determining the relative amounts of Oriental and domestic oils used, and in this connection a recent tendency to bring Oriental oils to the Atlantic and Pacific ports in tank spaces occupied on the outgoing voyage with fuel oil becomes a development of importance.

The Acme, a tank steam ship belonging to the Standard Oil Company, carried a cargo of 8,807 tons of petroleum from Port Arthur to Woosung by way of the Panama Canal. After cleaning tanks the vessel was loaded with 8,020 tons of cocoanut oil at Cebu, P. I., and returned through the canal to New York. The Pacific Mail Steamship Company intends to handle cocoanut oil in part of the fuel oil bunker space of the new ships of the "State" class, in the trans-Pacific service. They will bunker with enough oil for the round trip before leaving San Francisco, and for the return voyage will clean the tanks from which the fuel oil has been used and fill them with cocoanut oil.

MANUFACTURES IN ARIZONA AND NEW MEXICO FOR 1919

Preliminary statements of the general results of the census of manufacturers for the states of Arizona and New Mexico have been issued by the Bureau of Census, Department of Commerce. Compared with 1914 the summary for 1919 shows increases for both states.

For Arizona the increases, in order of their importance from a percentage standpoint, rank as follows: Capital, 323.5 per cent; cost of materials, 122.7 per cent; salaries, 108 per cent; wages, 83.7 per cent; value of products, 76.3 per cent; primary horsepower, 76.2 per cent; salaried employes, 56.8 per cent; proprietors and firm members, 55.8 per cent; number of establishments, 48.4 per cent; wage earners, 19 per cent; value added by manufacture, 2.9 per cent.

The capital invested, as reported in 1919, shows a gain of $130,379,000 over that of 1914 and the average capital per establishment was approximately $357,000 in 1919 and $125,000 in 1914. This does not include the value of rented property, plant or equipment which was employed in the conduct of manufacturing enterprises. The cost of materials used in 1919 shows an increase of $48,218,000 or 122.7, the average cost of materials per establishment in 1919 was approximately $183,000, and in 1914 $122,000.

	CENSUS 1919	CENSUS 1914	Per cent of increase 1914-1919
Number of establishments	478	322	48.4
Persons engaged in manufactures	9,954	8,014	24.2
Proprietors and firm members	416	267	55.8
Salaried employes	1,331	849	56.8
Wage earners (average number)	8,207	6,898	19.0
Primary horsepower	96,377	54,697	76.2
Capital	$170,679,000	$40,300,000	323.5
Services	14,395,000	7,647,000	88.2
Salaries	2,950,000	1,418,000	108.0
Wages	11,445,000	6,229,000	83.7
Materials	87,501,000	39,283,000	122.7
Value of products	113,015,000	64,090,000	76.3
Value added by manufacture (value of products less cost of materials)	25,514,000	24,807,000	2.9

Summary of manufactures for 1919 and 1914, for the state of Arizona, as published by the Bureau of Census, Department of Commerce. Preliminary figures.

For New Mexico, in the order of their importance from a percentage standpoint, the increases for the several items rank as follows: Wages, 147 per cent; value added by manufacture, 107.1 per cent; value of products, 91.6 per cent; salaries, 77.8 per cent; cost of materials, 74.4 per cent; capital, 69.5 per cent; wage earners, 51.9 per cent; primary horsepower, 38.4 per cent; salaried employes, 16.8 per cent; number of establishments, 5.2 per cent; proprietors and firm members, 3.4 per cent.

The capital invested, as reported in 1919, shows a gain of $6,242,000 over 1914, and the average capital per establishment was approximately $39,000 in 1919 and $24,000 in 1914. The cost of materials used in 1919 shows an increase of $3,298,000 over that of 1914, and the average cost of materials per establishment in 1919 was approximately $20,000, and in 1914, $12,000.

	CENSUS 1919	CENSUS 1914	Per cent of increase 1914-1919
Number of establishments	387	368	5.2
Persons engaged in manufactures	6,648	4,594	44.7
Proprietors and firm members	336	325	3.4
Salaried employes	576	493	16.8
Wage earners (average number)	5,736	3,776	51.9
Primary horsepower	17,260	12,468	38.4
Capital	$15,226,000	$8,984,000	69.5
Services	7,686,000	3,273,000	134.8
Salaries	1,026,000	577,000	77.8
Wages	6,660,000	2,696,000	147.0
Materials	7,728,000	4,430,000	74.4
Value of products	17,857,000	9,320,000	91.6
Value added by manufacture (value of products less cost of materials)	10,129,000	4,890,000	107.1

Summary of manufactures for 1919 and 1914, for the state of New Mexico, as published by the Bureau of Census, Department of Commerce. Preliminary figures.

AUSTRALIA CHANGES METHOD OF APPRAISING VALUES FOR DUTY PURPOSES

The most serious event in recent months affecting importation of American commodities in Australia, is a change in the method of calculating values for the purpose of assessing customs duties.

Formerly, under section 157 of the Customs Act, which directed that values should be appraised for duty purposes at a "fair rate of exchange," such appraisements have been made at the mint par of sterling and dollars, $4.8665 to the pound. Now they are appraised at the current or bank rate of conversion, which has varied in the past six months from $3.30 to $3.75. The change in method imposes an additional burden on American imports by causing the importer to pay duty on a higher value in pounds than would have been fixed under the former system. For example, under the old method goods costing $1,000 f.o.b. an American port were appraised for duty purposes ($4.8655 = £1) at £205 plus 10 per cent, or £220 10s. in all. The 10 per cent is added to all values ad valorem imports to cover freight, insurance, etc. Under the new method the $1,000 of goods is appraised at the bank rate of the day the goods are invoiced. The rate for the past few days has been $3.75 = £1. At that rate the goods would be appraised at £266 plus 10 per cent, or £292 12s., an increase in valuation for duty purposes of £46 2s.

Goods imported from France, Belgium, and Italy though paying the same customs-tariff duties as American, enjoy a great advantage over American imports, through the fact that their currencies are depreciated instead of appreciated, as measured in sterling. At this writing about 100 Italian lire are required to make a pound sterling instead of the normal 25. At pre-war rates of exchange an Italian motor car selling in Italy at 5,000 lire, and an American-car chassis selling in America at $1,000 would each have cost the purchaser in sterling about £200. Now, an Italian chassis whose home consumption value is 5,000 lire costs in sterling only £50, but a $1,000 American chassis costs in sterling £266. The Italian chassis pays £11 duty, the American £58. The increased price in lire which Italian exporters are actually charging on export cars probably does not increase the duty under the new ruling to more than £25, or to less than half the duty which the American chassis pays.

Electricity Makes Possible a Lower Cost and Cleaner Product

The President of the California Raisin Association, an Industry World Famous in its Rapid Rise in Wealth and Affluence, Herein Attributes to Electricity an Important Role in its Development.

BY WILEY M. GIFFEN
President, California Associated Raisin Growers

In this great West of ours, where development of nature's gifts is still in its swaddling clothes, electricity is playing a part so important that he who does not recognize it as the backbone of all industrial expansion must be shortsighted indeed. We have the most fertile soil in all the world. We can produce more varieties of fruits and produce them more prolifically than any other locality in the world. We are blessed with a monopoly of fruit-drying climate. The world is fruit-hungry; it always will be. And we of California must always satisfy that hunger.

WILEY M. GIFFEN
One of the leading figures in the dried fruit industry of the West.

But to develop these resources of ours we must have power, and of power there is an inexhaustible supply, awaiting our command here in our mountain ranges. Coal mines may yield their last ton to greedy furnaces; forests may bow to the axe and the wood supply vanish like the mist. But nature will continue on to the end of time piling the eternal snows on the mountain sides, sending the streams that mean power down through the canyons, ready for their harnessing at our hands.

Electricity has played an important part in the development of the raisin industry. It is beyond question destined to play a far greater part in the industry's future. Looking over the fertile acres surrounding Fresno, where the jackrabbit and the horned-toad and the ground-owl lived precariously only a few years ago, I marvel at the wonders wrought by irrigation, and I am impressed with the amount of that irrigation that is pumped out of the very ground itself by electricity.

And when I visualize the possibilities of the West that depend upon and must result from hydroelectric development, when I survey what electricity has done in promoting efficiency, economy and cleanliness in the manufacturing of our own product, I cannot but say that as develops the hydroelectric industry in the West so develops the West itself.

Sitting in my office here in Fresno, I see in my mind's eye before me a map of the West beyond the Rockies. I see its mineral wealth, its timber, its fisheries, its agricultural products, its citrus fruit industry, its acres of apple orchards in the North, and here stretching out beyond Fresno as far as the eye can reach, its acres upon acres of fertile raisin land.

Throughout the West I see here and there factories springing up, either as assembly plants, fostered by eastern enterprise, as branch factories, or as new plants to meet local needs for construction material, specialized mining machinery, and so on. I see the possibility of coordinating on this economic map a great section of our country, so that it will have an industrial program as a whole, and I see electricity playing a master part in this because it can furnish energy for light and heat and motive power.

Electricity is a civilizing influence in the world. The whole fabric of industry here in the West through this giant motive power can be moved forward. The California Associated Raisin Company has proven to its complete satisfaction that electricity makes possible a lower cost and cleaner product. Electricity has proven essential to irrigation of much of our valley land, whereon are produced the grapes from which our raisins are made. Furthermore, in the raisin packing factories there is a tendency to take over more and more the processes from hand operation to the operation of the method electrical, and it is our hope eventually to have the fruit go through "untouched by human hands."

The new Sun-Maid City Plant which has recently been completed in Fresno, California. 210 motors with a total capacity of 3500 hp. are used to carry on the many processes of treating and packing.

I will cite one or two instances of how electricity has helped us. By the installation of electrical driers, a saving in time of from four to five hours has been accomplished and the services of from ten to fifteen men saved in one of our factories in Fresno.

With the taking over of the packing house and its complete electrification, the services of more than one hundred girls have been dispensed with. By means of belt conveyors and elevators electrically operated the fruit is taken to upper stories and transferred to other buildings, and a so-called "elephant truck," which swings constantly from side to side of an elongated hopper, ingeniously secures the even distribution of the raisins on the conveyor. From here they are transported by means of a bridge to the adjoining building, where they are seeded and packed. There is always danger of nails or other iron refuse being included among the fruit, which would endanger the machinery of the seeder, as well as prove objectionable if not caught, and a system of magnetic pulleys has been devised by which practically all metal is extracted as the raisins pass between the two buildings.

I could go on indefinitely describing to you the economic processes open to the method electrical in the operation of the raisin packing plants, but I think I have said enough to show why it is that in 1920 Fresno county alone produced 122,500 tons of raisins, for which some $36,750,000 will be received by the growers when final payment is made, and why it is that this association has a membership of 12,000 growers and handles more than 92 per cent of the raisins grown in America.

The Fallacy of Competition in a Regulated Monopoly

BY E. O. EDGERTON

(A movement has been started in the state of Washington to repeal the "Necessity and Convenience Act" passed by the legislature of last year which would again throw public utilities open to competition in any district which a rival company might care to enter. The experience of California and the judgment of the California Railroad Commission are here expressed by the former president of that body. The "regulated monopoly," in his opinion, is the only solution.—The Editor.)

Experience has shown that it is decidedly in the interest of the public that a state utility commission should have power to prevent competition between public utility companies.

In practically all of the public utility acts or laws defining the powers of commissions there is included provision for compelling any person or corporation who desires to enter the field already served by an existing public utility to first obtain authorization so to do from the commission. Acting under this power, the California Railroad Commission, together with practically all the commissions in the United States which have such power, has adopted the rule that where a public utility company is giving adequate service at reasonable rates a competitor will not be permitted to enter the field.

It is now demonstrated that competition in public utility service and rates has not resulted in good service nor in low rates except for temporary periods, and always competition ends with waste and loss which is ultimately borne by the consumer.

The idea that competition is an automatic regulator of rates has proven fallacious. If real competition occurs rates are lowered by the company seeking to take business away from its rival, not on a basis of what the service costs but by lowering rates for the purpose of annihilating the competitor. For real competition to continue, each company in turn must reduce its rates below the other, because the moment they reach the same level of rates competition would cease. Therefore the company which is the stronger inevitably in the end destroys its rival or a point is reached where a realization comes to those who operate the companies of the folly and loss of such competition and consolidation is brought about, usually by the stronger absorbing the weaker company, and if competition has gone far enough, both companies are crippled and put in a position where they cannot adequately serve the public.

Furthermore, under modern conditions it would be a practical impossibility to persuade investors to provide sufficient money to parallel a large existing utility when the only hope would be that by constantly lowering the rates regardless of the cost of the service sufficient business could be obtained to destroy the rival. In other words, the investor would be asked to risk his money with no hope of reasonable returns thereon during the competitive period and with the inevitable prospect staring him in the face that some settlement finally would be made which undoubtedly would result in a loss of a part of his investment.

One serious result of throwing the field wide open to competition is that a designing and unscrupulous promoter can, by obtaining a franchise upon the promise of lower rates or better service, and without any substantial investment on his part, so shake the credit of the existing utility through the fear of investors that competition may occur, as to compel the existing company to buy him off. This opens a fruitful field for the blackmailer with no resultant good to the public.

Also it should be seriously considered that to take from a commission the power to prevent competition takes from state authority representing the people the power to determine this important question, and places it in the hands of the individual who through entirely selfish motives may at any time destroy competition which he himself has created by selling out to the rival. It must be realized that the state has no power to compel any individual or company to continue competition.

The people must ask themselves this question: Shall they themselves, through their representatives the public utility commission, determine the vitally important question as to whether or not there shall be competition, or shall determination of this question be placed in the hands of individuals who of course will be actuated by selfish motives.

Principles and Practice in Cooperation

BY G. HAROLD POWELL

(The citrus fruit industry is perhaps the most famous of all industries regarded as strictly western. It is also one of the finest examples on record of cooperative organization for mutual benefit. In the following article the general manager of the California Fruit Growers' Exchange tells how the cooperative system works in the handling of this important western product.—The Editor.)

The citrus industry of California represents an investment of 225 million dollars. For a period of twenty-six years the growers have cooperated in the distribution and marketing of their crops, and in the last ten years also in many phases of production, in fruit handling, in the purchase of orchard and packing house supplies, in the protection of their groves against diseases, insects, or frost, in the ownership of timber lands and the manufacture of boxes, and in the conversion of low grades of fruit into by-products.

California Fruit Growers' Exchange

The California Fruit Growers' Exchange is a non-capital, non-profit association of 10,500 growers of citrus fruits, which provides the facilities through which their fruit may be sold at cost to the wholesale trade. There are 202 associations of growers in the Exchange representing three-fourths of the citrus fruit of the state. An association builds a packing house, harvests the fruit of its members, assembles it in the packing house and there grades and packs it in accordance with the rules of the Exchange. These associations are financed by the growers and are operated exclusively for them. They are managed by a board of directors through a salaried manager.

The associations of a community federate into a non-profit District Exchange with a director from each. The District Exchange acts as a clearing house between the associations and the California Fruit Growers' Exchange in handling the marketing problems of the associations. There are 20 of these District Exchanges. The business of each is handled through a manager.

The California Fruit Growers' Exchange is a non-capital, non-profit association formed by the District Exchanges, with a director representing each District Exchange. There are therefore 20 directors for the Central Exchange.

Keeping in Touch with the Markets

The California Fruit Growers' Exchange furnishes the facilities through which the fruit of the growers is sold on a delivered basis except in a few "pocket" markets. It places exclusive, salaried agents in the principal markets of the United States, Canada, and in some foreign countries, through whom the fruit is sold to the wholesale trade. It owns and controls the trade-mark "Sunkist" under which the higher grades of fruit are sold. It gathers daily information of the conditions in each market affecting the sale of citrus fruits, and distributes it in bulletin form to the associations, thereby giving instant information to the members for guidance in their daily distribution. It collects the money for the fruit sold and transmits it to the District Exchange, takes care of litigation arising from the sale of fruit, handles all claims, develops new markets, cooperates with the wholesale and retail trade through dealer service work in developing the best methods of salesmanship, and conducts a national campaign of advertising and of trade promotion to increase the consumption of citrus fruits.

Volume of Business

In 1920 the Exchange growers sold 34,461 carloads of citrus fruits to the wholesale trade, which returned sixty million dollars to California. The cost of the Exchange, including that of the District Exchanges, sales service was 6.63 cents per box, or 1.35 per cent of the delivered value. In addition, there was invested in national advertising and trade promotion one-half million dollars, making a total sales and advertising expense of 2.01 per cent of the delivered value of the fruit. Due to the increased volume of business handled, the Exchange selling cost, including advertising, was lower in 1920 than ten years ago.

During the last seventeen years there has been returned to California through the Exchange $376,000,000. The losses from all causes during this time

The packing of oranges is one of the operations which can not be accomplished satisfactorily by machinery, and hand labor is employed. This shows the interior of one of the Sunkist packing plants where the oranges are prepared for shipment.

in dealing with 2500 or more wholesale merchants have been approximately $8,775, or 9/4000 of 1 per cent of the f.o.b. returns.

Supplementary Activities

The Fruit Growers Supply Company, which handles the purchases of orchard and packing house supplies for the Exchange Growers, owns 65,000 acres of timber lands and operates mills and factories for lumber and box making. It has an authorized capital stock of $1,500,000 which it is increasing to

In the distribution of the fruit it is shipped long distances in refrigerator cars. This shows the method of cooling the cars by blowing cold air through them, after which they are iced, loaded and sent on their way.

$4,000,000, owned and contributed exclusively by the members. It has the same board of directors as the Exchange.

In 1920 the Fruit Growers Supply Company transacted a business of $8,750,000 in packing house and orchard supplies at an operating cost of $1.34 per $100 of value on purchases. The Exchange growers own 1,350,000,000 feet of virgin timber, purchased at pre-war prices. The growers will have two modern sawmills and box factories with a capacity of 125 million feet annually, which will take care of their present annual requirements.

The Exchange members carry insurance on the packing houses and their contents under a mutual indemnity compact at a cost of not more than 25 per cent of insurance under the old line insurance rates and they have formed cooperative associations for the manufacture and sale of lemon and orange by-products at cost. It also carries industrial accident, total disability, and death insurance on its employes without cost to the latter.

Need for Efficient Distribution

With the rapid rise in costs during the last few years, efficiency in production and marketing has become even more vital to the farmer as well as to the public.

Economy in production, efficiency in packing, intelligent distribution, thorough standardization, the elimination of decay, cooperative purchasing of supplies, the development of by-products, and a systematic effort to stimulate demand constitute the growers' opportunity to meet rising costs. And to avail himself of these opportunities requires cooperation, the handling of a large volume through a central agency and a high type of organization.

The cooperative association that accomplishes these economies and reforms is reducing the cost of production and marketing, and conferring a direct benefit upon both producer and consumer.

The Northwest in the National Cooperative Movement

BY BRUCE LAMPSON

(Inefficient distribution rather than under-production is the cause of many of our troubles today. How the Northwest is setting out to solve this problem by means of cooperation is told here by the assistant organization director of the Washington and Idaho Wheat Growers' Association.—The Editor.)

For years past the farmer organizations of the Northwest, as elsewhere, have been earnestly plodding away at the solution of their marketing and other economic problems. Their success was limited and they finally came face to face with the fact that the great speculative system through which they had to sell their products was organizing more rapidly than were the producers. The speculators were "establishing prices at country buying points."

The Northwest began to look for some form of organization that would cope efficiently with this wasteful system of distributing farm products. The great spread that now exists between the producers and consumers is wasteful.

Plan of Organization

The search for an efficient plan soon revealed the fact that the California plan of pure cooperation was the most sound economic method of distributing produce. It was found that this was the one plan that was actually solving the problem of distribution for the producers. It was saving whole industries.

Mr. A. A. Elmore, president of the Farmers' Union for Washington and North Idaho, arranged with Mr. Aaron Sapiro of San Francisco to present the California marketing plan at the annual convention of the Farmers' Union at Spokane, December 19, 1919. At this meeting a tentative organization was effected. A membership contract was drawn up and actual organization work was started. These membership contracts were to be valid and binding only after 25% (approximately fifteen million bushels) were signed up from Oregon, Idaho and Washington. More than this required amount was secured, and the contracts were validated on March 1, 1921, after a long fight with keen opposition.

During this time Montana became interested and the work progressed in that state. The plan in each of the four states was identical. It provides that the producers of wheat bind themselves together for a period of years to sell their wheat in a pool. The members elect their own directors to control the pool from among their number. It is a non-capital stock, non-profit, selling organization. The growers of wheat collectively sell their own product on the world markets.

The directors, who are wheat growers, do not leave their farms and become expert salesmen, financiers or traffic managers, etc. To accomplish this work they hire highly trained specialists to operate each department of this selling agency, just as they

One of the fertile valleys of Idaho, where the cultivation of grain and other agricultural products has been forwarded by electrical pumping and cooperative distribution

hire an attorney to do their legal work or a doctor to do their family doctoring, or a trained mechanic to repair their automobiles.

A Central Selling Agency

On March 1, 1921, representatives of each state, Oregon, Idaho, Washington and Montana, met in Spokane and established a central selling agency. It was named the Northwest Wheat Growers, Associated.

This selling agency will have complete control of the wheat of the associations of the four states. This agency will distribute the wheat as direct as possible to the consumers during the entire selling season. There are at this time over twenty million bushels of wheat signed up, and at the present rate at which the new members are joining, there will be thirty million bushels by the time the new crop is ready to market. This will represent approximately fifty per cent of the wheat of the Northwest.

About seventy-five per cent of the wheat of the world is harvested in June, July and August. It has been dumped on to the market by the producers. The farmers have been producing and then dumping their produce on the market. This organization will distribute the wheat in a systematic and orderly way over the entire selling season.

The Spread of the Cooperative Idea

This producers' selling or distributing agency is probably the largest single wheat distributing agency in the world and the work is only started. The Middle West and the East are now working on a similar marketing plan through which to sell the grain of the United States. There is a great educational campaign going on in Canada. The Canadian farmers are becoming educated to the principles of pure cooperation. They are preparing to merchandise their own wheat on the world market in 1922.

The apple growers of the Wenatchee district of the state of Washington have just completed a cooperative marketing organization based on the California plan. They have assembled under a long term contract the largest tonnage of boxed apples in the United States. The poultrymen of eastern Washington are now forming an organization to market their produce, modeled after the plan of the Western Washington Poultrymen's Association, which is the same in essentials as that of the California organizations. The Washington wool growers are now organizing to make their wool into cloth through a cooperative plan. The Cooperative Milk Producers of the Inland Empire with headquarters at Spokane are now permanently organized and will be operating in the near future.

Part of the world is hungry and poorly clad while there is ample food and cloth on the farm and in the warehouses. In hundreds of instances this material is going to waste—the speculators are between the producers and the consumers. They have the marketing information and the finances. They are demanding great toll for the use of their marketing knowledge and money. After years of dire necessity the producers have become educated to cooperation.

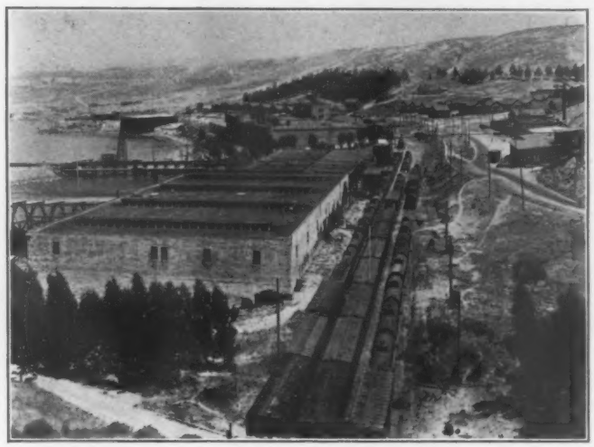
Bearded wheat ready for the harvest. The great acreage in the northwest and intermountain districts are handled with greater efficiency since the advent of cooperative organization among the growers.

The great Northwest is aflame with the spirit of cooperation—it is educated to the cooperative possibilities. It is a standard bearer in the state, national and international economic and social improvement.

Lighting Up a Dry Town

(Prohibition is, next to the weather, the most popular subject of conversation yet invented. It may be treated flippantly or tragically; as a joke, a curse or a blessing, or as a "business proposition"—which is capable of being all three at once. We are pleased to present herewith a sketch of its effect upon the power companies, and upon general local business activity, of which the power company is a barometer.—The Editor.)

What has become of the saloons, the breweries and the distilleries? Have they been replaced by just so many vacant buildings? Has their banishment meant a loss of business to the real estate interests, to the power companies, to the neighborhood? To ascertain to some extent the effect which prohibition has had upon local business activity in general, and upon the power companies in particular, Journal of Electricity and Western Industry sent out a questionnaire to a number of western power companies, and received many interesting replies.



A large California winery which has now turned its attention and its equipment to the manufacture of grape juice, and is doing a thriving business.

When the Leopard Changed Its Spots

It is a noticeable fact that distilleries, breweries, and wineries formed a practically negligible part of the power company load in the West, and their passing has had but little effect upon this type of business. No distilleries were reported in the power company replies, and only one or two breweries, and the winery on the list was transformed into a cannery when prohibition came into force, and has been a larger user of electric power since its transformation than it was before, the comparative figures being given as 162,983 kw-hr. for the year ending January, 1919, and 343,410 kw-hr. for the year ending January, 1920. One brewery became a soda bottling works, and another assumed the innocuous role of an ice cream factory. Both are reported as prosperous, and as more profitable loads for the power company than in the days preceding their regeneration.

The saloons presented a different problem. Most of the power companies served a goodly number of these convivial establishments, and because of the nocturnal habits of the species, the lighting load was far from a negligible one. One small town reports a total of 31 saloons to 5000 inhabitants—a picture which would lead one to expect that prohibition would put the entire town out of business, not to say out of temper.

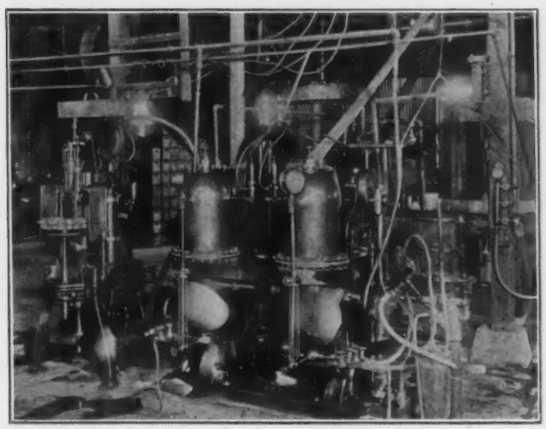
In the Seats of the Mighty

We are all familiar with the desolate boarded-up structures that stare blankly at each other across many of our down-town street corners. We naturally tend to overlook, on the other hand, the erstwhile saloons that have undergone a metamorphosis and have been changed beyond all recognition. The insatiable thirst of the human animal is indicated by the fact that the majority of these establishments found it most profitable to continue to cater to it, albeit with beverages less stimulating than heretofore. Out of about 195 saloons in Sacramento, for instance, some 160 became vendors of soft drinks; of 55 in San Diego, 20 selected a similar career. The fact that lemonade will go into the same kind of vessel as whisky has, of course, something to do with it, and it stands to reason that if one owns several hundred dollars' worth of glassware, mixers and straws, one does not tend to set up a haberdashery store.

Nevertheless, the successors of the saloons are not all soft drink establishments. In many cases the swinging doors have vanished, and in the places where men formerly gathered to drown their troubles they now resign themselves to a shave and haircut. Among the new street-corner substitutes in San Jose, California, are listed a telegraph office, a bank, a hotel, a public employment agency, two electrical supply stores, and a theater. In another town the neighborhood must have been mildly surprised to find on one of its old familiar corners a Y. M. C. A. reading room ready to supply spiritual nourishment as a substitute for the world, the flesh and the devil.

Making Two Lights Grow Where One Grew Before

The casual observer might assume that the majority of these substitutes, though perhaps good for the soul of the public, would not be good for the purse of the power company. A grocery store with a six-o'clock-closing habit cannot pretend to use as much current for lighting as one of its glittering predecessors, which sometimes illumined the street with its cheerful glow until a reproachful dawn made its efforts unnecessary. The power company reports, however, show another side to the question. In small towns it was noticeable that for every brilliantly lighted saloon there were a dozen or more darkened houses, and when it is remembered that the rate for residence lighting runs considerably higher than the commercial rate allowed to the saloons, the gregarious souls who exchanged stories and drinks until



Soft drinks are a favorite substitute for the more stimulating beverages, as far as the manufacturers are concerned. Here is an electrically driven carbonizer in an erstwhile brewery, putting a champagne-like "fizz" into lemonade and ginger pop.

midnight are seen to be in effect less valuable customers than they would have been had they burned their respective home lights until 10:30.

A Distribution of Benefits

Moreover, as long as there were saloons, cash moved steadily and inevitably in that direction. The lady of the household usually received less of it for home expenditures than she would have done had there been no saloon; consequently, she was less likely to indulge in an electric toaster, or an extra light over the kitchen sink. One power company in a small town reports that its receipts have been doubled since the advent of prohibition. Another remarks that an entirely unexpected income is forthcoming from the residence section on account of the number of electric heating devices being used in home brew stills!

From the point of view of the real estate interests, and general business activity, the results vary somewhat according to the locality. Of course an appreciable number of saloons now stand empty, ranking merely as unsightly landmarks and unprofitable investments. But in cases where they have been replaced by stores, moving picture theaters, restaurants, and so forth, these have tended to improve the neighborhood in a number of different ways. The locations surrounding them have become more desirable, as a rule, from both the business and residential standpoints, and in the cases where the landlord has pulled down the saloon building and built an office, for instance, his income from the property has been materially increased.

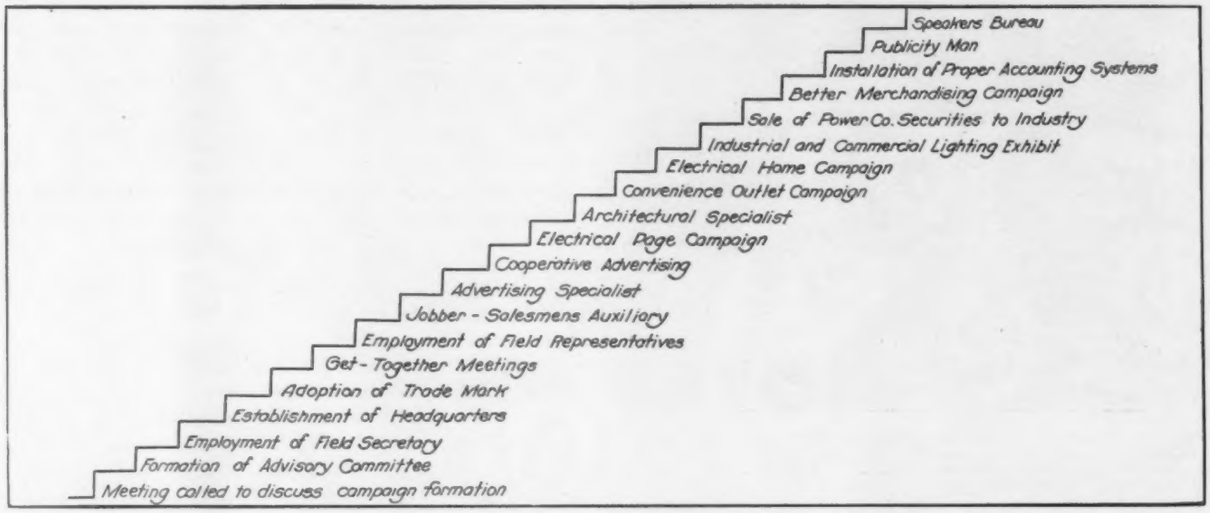
In the matter of payment of bills, there is a difference of opinion, or rather of experience, among the power companies. About six out of ten say that the new establishments are as prompt as the saloons used to be. The others say, plaintively, that they are not. One company throws considerable light on the subject by stating that the saloons, especially in small communities, collected most of the money in town, and therefore were in a position to pay their power bills promptly; but at the same time the payments from other sources tended to be less prompt, the money having been collected by the saloons. Even in the cases where the successors of the saloons are not quite as prompt in meeting their bills, it is often true that the rest of the community, which was formerly behindhand, is now able to pay up regularly. This is true of the small business houses as well as of the homes. The grocer receives his money more regularly when it is not diverted to the saloon, and is consequently more regular in the settlement of his own bills, both for his lighting and his stock-in-trade.

Keeping the Dollar Moving

From this collection of data it is obvious that though the power companies have lost, with the passing of the saloons, a number of very good lighting customers, the indirect benefits have in the majority of cases more than offset the losses. The power consumption in the home has a tendency to increase, new businesses have sprung up in what was formerly a down-at-the-heel neighborhood, and there has been a corresponding stimulation of commercial activity in general, including the sale of electrical household appliances.

Extreme prosperity of the saloon usually implies a congestion of resources in that quarter, and a corresponding mal-distribution in other parts of the neighborhood. A better circulation of the dollar is one of the indirect benefits which prohibition has conferred on the power company and other local interests, especially in the small community. Thus in spite of shuttered windows and mutilated Scotch whisky signs, business does not seem to be going to the dogs. Though the grocery store may seem to the casual observer to be a poor substitute for the saloon as a power company customer, and as a maker of business, "things are not always what they seem"; and, to misuse a little more of the same poet, though life may now be but an "empty" dream to the inordinately thirsty, it is useless for the thirsty one to tell the world in mournful numbers that the saloon was the business backbone of the neighborhood.

A plant which was once a brewery now makes 650,000 gallons of ice cream per year. The picture shows the tanks in which the mixture is made.



The upward steps in starting a cooperative movement. The order in which the different branches of the work are started is an important factor in the success of the organization.

How to Start an Electrical Cooperative Campaign

BY ROBERT L. ELTRINGHAM

(Cooperation on a large scale is not an automatic human impulse. In industry it is conceived by a group of practical enthusiasts, and built up step by step through all its intricate phases. Following is an article by the executive secretary of the California Electrical Cooperative Campaign, showing how this famous western movement grew up to be the power it is today. —The Editor.)

In an effort to set forth an effective plan for starting an electrical cooperative campaign, the subject might be treated purely from a theoretical point of view where a precedent had not been established, from a practical point of view where such a plan had been carried out with some degree of success, or a combination of the two in the light of experience gained by contact with such an undertaking.

True Meaning of Cooperation

First of all the true meaning of the oft misapplied term—cooperation—should be reasonably well understood and a whole hearted willingness manifested to subscribe to all that it stands for. Let us define cooperation and see how it fits in with the nature of things or whether there is any need for it in finding a solution for the many intricate problems presented by the great electrical industry.

Cooperation,—To act or operate jointly or collectively with others for their common benefit. It would seem in this age of great things far beyond the ability of single individuals that collective action is indeed essential to material advancement. Not only is collective action vital to progress but a firm belief in its principles is a decidedly helpful factor.

The man who stands idly by and only falls into line when he sees the mass assume the form of an orderly procession, is not the brand of cooperator that can be counted upon when needed.

Cooperation, then, truly finds its place in the electrical industry and the first thing to do is to see that everyone in any way connected with that industry is fully convinced of its value and 110% imbued with the idea.

Bear in mind right here that the accomplishment of this seemingly simple part of the program depends in no small way upon the extent that the individual is willing to set at rest for a time at least all petty jealousies and feeling of suspicion toward the impelling motive behind the cooperative movement.

This accomplished, we have now laid a foundation upon which to build a structure which will in every detail conform to material and methods employed in its construction.

How Plan of Campaign Should Be Presented

An excellent opportunity for presenting the plan of an electrical cooperative campaign is at a dinner to which all connected with the industry are invited to attend. The atmosphere and general surroundings should be such as to suggest the importance and dignity of the affair without too much dignity. Now choose those to present the plan who are fully representative and enjoy the confidence of their respective branches. Let us all rise up in unison and testify to the support of a campaign whose aims and purposes are to carry to the highest stage of development that industry which has contributed to the advancement of modern civilization through the agency of electricity. Believe it, preach it, work for it, keep it free from organization politics and your efforts will be crowned with success, for you will build beyond your wildest expectations.

Formation of Advisory Committee

After such a dinner the next step is the formation of the Advisory Committee which should be composed of representatives of the various branches

of the industry. These men should be carefully chosen; they must be men who believe absolutely in the principles of cooperation and men who are willing to give of their time unselfishly and who are willing to work hard for the success of the campaign. The various steps followed by the California Electrical Cooperative Campaign are shown in the accompanying chart which covers the activities of the Campaign for its first three years.

In no activity of the Campaign have results been more striking than the work of promoting closer relation between the power companies and the electrical contractors and dealers. The first two years' effort established the foundation of a much better understanding than had previously existed between these two branches of the industry, but the accomplishments of the past year have gone far beyond that. The stage of improved relations has now been left behind and the past year shows an active and constructive cooperation between the power companies and the contractors and dealers.

Power Company Employes and Dealers

Power company employes are enthusiastic about the cooperative idea and have worked closely with the dealers, promoting the latter's business and assisting them in all ways possible. The dealers for their part are reciprocating in every way, as in assisting the power companies in selling their stock direct to the public; helping them to care for complaints on their lines, and bringing about a better understanding with consumers in such matters as the settlement of disputed bills and convincing consumers of the justness of power company rates. Dealers are also operating actively in civic associations in the interest of the power companies. It is significant in this connection that a large percentage of the contractors and dealers now own stock in power companies.

The third year of the Campaign has brought several branches of the industry into still closer and more effective harmony. The convenience outlet idea and the necessity for better lighting have been brought home to the public in spectacular ways and the cooperative idea has spread beyond the confines of California, expanding into a western movement which bids fair to become nation-wide in its scope. The outstanding results of this last year's work in California are: first, the increased demand for convenience outlets; second, the education of the public through (a) electrical home and (b) industrial and commercial lighting exhibits; third, mutual assistance rendered by power companies and dealers to each other; fourth, progress in merchandising and business methods by contractor-dealers; fifth, increase in advertising.

Besides these visible accomplishments, the Campaign has achieved another and fundamentally important thing, an intangible something which pervades and animates all other results—it is a frame of mind; the desire to progress; an eagerness to cooperate for the best interests of the public and to the industry as a whole.

Plans for Coming Year

The plans for the coming year include the following principal lines of action: first, the extensive development of the convenience outlet idea through personal work with architects and builders and subdividers, through the establishment of electrical homes and by lectures and bulletins. This work will include the presentation of the idea to organizations of journeymen electricians. The manufacturers also will be approached through Garnett Young's article on "The Possibilities of the Convenience Outlet Campaign," which was published in the Jan. 1, 1921, issue of the Journal of Electricity. One thousand reprints of this article have been distributed among the contributors and also sent to all eastern electrical manufacturers, together with letters urging their cooperation in advocating convenience outlets through their advertising in the popular magazines. An illustration was inserted in the reprint to show how effectively cuts, when used in advertising, portray the use of convenience outlets and electrical household appliances. The reprint also shows the thumb-nail sketches run by the Journal of Electricity in support of the idea. Second, furtherance of proper accounting by electrical contractors and dealers through lectures and bulletins, tying in with the correspondence course which the Cooperative Campaign, assisted by Journal of Electricity and Western Industry, has arranged with the University of California to establish and which is now being run in Journal of Electricity and Western Industry. Third, bringing to the attention of the industry and the public the vital importance of the development of our hydroelectric resources through a Speakers' Bureau, providing speakers of recognized authority to present this message on all proper occasions to such bodies as the Rotary Club, Chamber of Commerce, and Improvement Clubs. This work will be correlated with the work of the Public Relations Committee, Pacific Coast Division, National Electric Light Association, and will be supplemented by bulletins and other publicity. Fourth, the subject of industrial illumination will receive much attention throughout this year through the permanent and portable exhibits and through lectures.

New Work for Field Men

A new line of activity has been planned for the field men for the coming year. In the past their work has been with individual contractors and dealers throughout the state, but as this field has now been very thoroughly covered it is proposed to have the field men present addresses on the subjects affecting the electrical industry to meetings of members of all branches of the industry at various times and localities throughout the state. The field men in the Secretary's office will arrange for these various meetings and, with the cooperation of all branches of the industry in the localities selected, will endeavor to procure full attendance of local members of the industry at these meetings. The field men will continue work with individual contractors and dealers in cases where local conditions justify such effort.

Some of the subjects on which the lectures will be given are: Industrial and Commercial Lighting; Convenience Outlets; Contractor-Dealers' Accounting; Financing Hydroelectric Development Through Self-Interest; Salesmanship and Service to the Public; Your Responsibility to the Industry; Advertising; Window Display and Store Arrangement.

The problem of starting and maintaining Cooperative Campaigns must be largely governed by local conditions, and the brief outline that has been given of what the California Electrical Cooperative Campaign has accomplished in the past must merely serve as an example of what has been done successfully in one locality and the brief sketch of what it hopes to accomplish in the future only as a guide to efforts in other places. A hard and fast rule cannot be laid down for this development work. Once your industry is sold on cooperation in the truest sense of the word, there will be no difficulty in maintaining a campaign and no doubt as to the benefits that will accrue to the industry.

Steps Necessary to Start Campaign

The first step is the meeting to explain the benefits of cooperation to all the members of the industry in the community. Next, the formation of the Advisory Committee whose function it is to direct the activities of the campaign. Then the field secretary, who carries out the suggestions of the Advisory Committee and handles the detail work. The establishment of the headquarters should be carefully selected and be as nearly central as possible to all parts of the industry. The trade mark should be symbolic of the aims of the league or campaign and be carried on the letterheads, etc. Get-together meetings to hold the interest of all the members of the industry and to keep them acquainted. Then it is time to employ the field representatives who will work among the contractor-dealers to help them in establishing better business methods. Next, to enroll the jobber salesmen in an auxiliary to follow up the work of the field representatives by urging their customers to follow up suggestions of the representatives of the campaign. An advertising specialist is then employed to help the contractor-dealers in the preparation of copy and to sell the idea of electrical pages to the newspapers and the contractor-dealer. Cooperative advertising will be directed by the advertising specialist in which the power companies, contractor-dealers and other branches will advertise together to put over some idea of vital interest to the industry. The electrical page is another duty of the advertising specialist. After cooperation is understood and practiced by the majority of the industry it is time to employ an architectural specialist who will call upon the architects and builders and impress upon them the necessity of proper outlets for electrical appliances. He will direct the campaign of education on the matter of convenience outlets necessary before the electrical home is attempted and will make the arrangements with the subdividers for the electrical home. Then it is time to begin to pay attention to the establishment of an exhibit which will demonstrate the benefits of proper commercial and industrial lighting to men in charge of industrial plants and commercial establishments. Then the "self-interest" story should be so well known that if the local power company is putting out a bond issue or starts the sale of stock it should be supported by the industry as a whole, not only by subscribing themselves but by helping to sell the stock. Attention should then be given to increasing the efficiency of the merchandiser by instituting better merchandising shows and by urging the installation of a proper accounting system. The campaign should then put on a publicity man who will follow up the activities of the campaign and see that attention is given them by the local press. Finally, a speakers' bureau should be instituted to be composed of prominent men in the industry who would "tell the world" at every opportunity, meetings, luncheon clubs and banquets, that the development of their community is dependent upon the development of cheap electric power.

FARMERS MARKETING PLAN

The American Farm Bureau Federation has issued a statement giving the details of the grain-marketing plan based on the incorporation of a grain growers' cooperative National Sales Agency, which it was voted to recommend to the farmers of America by the Farmers' Grain Marketing Committee of Seventeen at its recent meeting.

"It is contemplated that the National Sales Agency will control, through ownership of the voting stock, the following:

"A. Terminal Agencies.—Branch sales offices will be provided at important grain markets to handle the grain for each natural grain district.

"B. Warehouse Corporation. — In connection with the branch sales offices, it will be necessary to provide government-licensed warehouses, from which warehouse receipts will be issued and used as a basis of credit.

"C. Finance Corporation.—A finance corporation is contemplated in order to provide adequate farmer-controlled credit facilities whereby country elevators may properly finance the moving of the crop in an orderly fashion.

"D. Export Corporation. — The farmer-controlled export corporation will provide proper facilities for marketing the exportable surplus of grain.

"E. Service Departments.—The service departments are designed to furnish accurate information on local, regional, national and world-wide conditions which affect the grain trade.

"The membership subscriptions of the growers will provide the National Sales Agency with the initial working capital necessary for the acquisition of facilities for the immediate handling of grain on consignment. Later the running expenses of the National Sales Agency will be secured by assessing a handling charge on the grain marketed through its offices."

How to Put On an Advisory Committee Meeting

BY R. M. ALVORD

(The success of any movement is largely dependent upon the enthusiasm and regularity of the individuals composing its executive groups. In the following article the manager of the supply department of the General Electric Company in San Francisco, describes some of the methods employed by the Advisory Committee of the California Electrical Cooperative Campaign, which has worked so efficiently for the past three years.—The Editor.)

One of the requirements for successful Advisory Committee meetings is a regular 100% attendance. Here in California meetings are held but once a month, and if the members are to keep up-to-date and active in their part of the management of the Campaign, it is essential that they attend each and every meeting. The fact that there has been almost a 100% attendance, has contributed in no small part to the success that has been achieved here. The chairman has not missed a meeting in the three years, and over. in which the Campaign has been operating. Two absences is the largest number on the record of any of the original members. There has been likewise a very regular attendance on the part of the members who have joined the Advisory Committee more recently.

Planning the Meetings

To attain this result it is necessary, first, to have men on the Advisory Committee who can and will give the proper amount of time to its work, and, second, to arrange the particular time for each meeting with due regard to the convenience and business activities of the various members. After the meeting time and place have been arranged, it should be the duty of the secretary to collect from previous minutes and discussions, and from the members of the committee, a list of subjects to be discussed at the approaching meeting. This list of subjects, with perhaps some comment regarding the newer ones, should be placed in the hands of the members a few days prior to the meeting, so that they may have time to give the subjects some thought, and be prepared to discuss them properly at the meeting.

The minutes of Advisory Committee meetings should consist of reports on formal motions, and on other statements of fact or proposed action which the secretary may be instructed by the committee to report. The minutes should be sent to the members promptly following each meeting, and it should be each member's responsibility to read the minutes carefully and to write the secretary regarding any changes or corrections which should be made in them. Unless there are such changes or corrections to be made, it is unnecessary to take time to read the minutes at the following meeting.

The Demands of Committee Work

In order to get the best results from the meetings of the Advisory Committee it is also advisable that care be exercised in arranging the conditions under which the committee works. It is realized by all who have done committee work that, hour for hour, it is probably more tiring than other work which a business man or executive is called upon to do, and that the best results cannot be obtained from discussions held at the end of a long full day and evening session. Therefore, considering the important nature of the problem to be handled by the Advisory Committee, it has seemed advisable to spread the meeting over a two-day period, rather than to crowd it into one day, with the necessity of an added evening session.

Getting the Committee Members Acquainted

This two-day period has made possible another activity among the committee members which, in my judgment, has been very beneficial to the results of the campaign. It has enabled the members to take one evening or one afternoon for play together —sometimes it is a dinner at a cabaret, sometimes it is golf in the afternoon, and at three or four meetings it has been in the form of a special entertainment arranged by individual members. This time at play has served to bring the members of the committee much closer together personally than would ever be possible simply by meeting together on a formal basis. The time at play develops a friendly cooperative spirit—a willingness to give and take, and through this excellent spirit has the committee been able to reach agreements on the different problems. There has been from the first an unwritten, unstated rule that no action will be taken unless all members agree to it. Everyone who has had experience with committee work of this kind will realize how important, under such conditions, is the friendly cooperative "give and take" spirit.

Inviting the Outside Viewpoint

Another practice of the Advisory Committee in California that has added much to its meetings has been that of inviting a number of contributors and other prominent men in the industry to sit with it at luncheon, probably on the first day of its meeting, and to continue in the meeting, should they so desire, throughout that afternoon. Let it be known here that any contributor is welcome to sit in the meetings at any time, but for these luncheons and these particular meetings special effort is made to get various contributors and prominent electrical men to come. This has been beneficial in two ways: first, the committee has benefited by the ideas brought in by these men, and, second, these men, representing the industry at large, and certain contributors in particular, have gained a better idea of the work of the Advisory Committee and of the Campaign, and have thereafter done more to support it and help it along. There have been a number of instances where men who were somewhat doubtful as to the advantages of the Campaign, or who were, at most, lukewarm with respect to it, have been converted to

enthusiastic boosters by sitting through one of these noon and afternoon sessions.

But, after all, the success of the Advisory Committee meetings, and with it the success of the Campaign, depends upon the spirit with which the members of the Advisory Committee attack the problems. In California the committee, recognizing the fundamental truth that "He Profits Most Who Serves Best," and the fact that no activity would be ultimately beneficial to our industry unless it in some manner served the public, adopted as its slogan "Better Service to the Public." Its proposed activities are measured, if not orally, at least in the minds of the members, by this yard stick and are discarded if they do not measure up to it. Further, the Campaign, operating on this basis, can go out and tell the public, through various organizations, what it is doing, thereby gaining the public's confidence.

Five-room bungalows with seven convenience outlets in each. The builder sells houses of this type before they are even completed.

A FEW SUGGESTIONS ON HOW TO PUT ON A "CONVENIENCE OUTLET" CAMPAIGN

In order to bring about a complete electrical installation in all modern homes, and no home can be classed as modern or comfortable unless there are at least two convenience outlets in every room, it is necessary, first, that the architect, builder and home

A six-room house of modern design but having only one convenience outlet. This house was built in 1919 and is still for sale. It has never been occupied.

owner believe as we do, that electrical conveniences are as necessary in the home as the cabinet kitchen or sanitary bathtub.

How can we make them believe as we do?

(1.) Call upon the architect and bring to his attention the necessity of specifying "Standard" convenience outlets in every room on all classes of residence jobs in order that the housewife may use her electrical appliances and labor-saving devices conveniently and efficiently without disturbing the illumination or having any unsightly cords dangling from the lighting fixtures. It is a well known fact that a person engaging an architect to design his home looks upon this architect as a genius, one who knows every detail about home construction, and naturally expects a modern, comfortable home. Is the architect, then, giving his client the service and advice to which he is entitled, if he does not provide a reasonable number of convenience outlets in each room and a screen porch that will accommodate a modern laundry equipment?

(2.) The majority of homes are not built under the direction of an architect, but by the builder of homes on a commercial scale, who buys stock plans from an architect or designer and proceeds to erect row after row of houses, equipping them with as little wiring as he thinks he can "get by" with. We must then reach this builder and salesmen for the larger subdivisions and inform them of the number of "extra plugs" that their clients are forced to have wired in at disproportionate costs in order to use their electrical appliances conveniently. Encourage the builder to build larger screen porches and install more convenience outlets while the house is under construction and use them as a sales argument, just as they did the cabinet kitchen and built-in ironing board. They all admit that the woman is the determining factor in the sale of a house. Why not, then, use the electrical conveniences as an appeal to the woman? They have had an opportunity to see or read about the "Modern Electrical Homes," with all their conveniences and labor-saving devices, that have been exhibited in California during the past year.

(3.) After cooperation within the industry, such as we have in California, has been obtained, put on Modern Electrical Homes as outlined in the Campaign's bulletin on Modern Electrical Homes, in the larger cities. These homes afford an excellent opportunity for the general public and prospective home owners to see how conveniently the electrical appliances can be operated from the "convenience outlets" which are installed in every room; and when they plan to build or buy a new home, they will demand the same conveniences that they saw in the Modern Electrical Home.

(4.) Call at all new houses under construction and convince the wireman on the job, from a self-interest standpoint, of the importance of selling the owner or builder more convenience outlets in order to make the home more comfortable or salable.

How to Install An Accounting System

(The Standard Accounting System is not a highly complex set of books which no one but a certified accountant can hope to understand; nor is it so revolutionary that the average contractor-dealer must suspend business and lose money over its installation. Following is an account of how it has been done by the Capitol Electric Company of Berkeley, California.—The Editor.)

One of the best things about the Standard Accounting System is that you need not close up shop and suspend business while you install it. The Capitol Electric Company of Berkeley, California, is one of the shining examples of how to do it, and its managers will tell you that the daily round and common task did not suffer in the least during the process.

Planning a Practical Demonstration

This company was not one of those who went out and demanded the Standard Accounting System. It had a comparatively satisfactory system of business records already in operation, though this was carried on principally as a basis for keeping customers' accounts, without the detailed analysis of the whole cost of doing business which the Standard Accounting System includes. The company's new departure was mainly the result of pressure from without, which took the form of gently persuasive visits from a member of the California Electrical Cooperative Campaign, a professor of accounting, an editor, and a research accountant. These found the management very open-minded, however, and after a few days were informed that they would be allowed to use the store as a laboratory, and to install the accounting system from the first detail to the last.

The research accountant, who, incidentally, is the author of the series of articles on the system now being published in these pages, was promptly given access to the company's books, and permitted to come and go as he pleased. The fullest cooperation was accorded him in his work, and everything proceeded with perfect smoothness and dispatch.

The Order of Procedure

The simplest part of the system on which to begin is the job envelope system. A job envelope was started for every contract job under way, and all material and time slips relating to each job filed in the proper envelope. The methods of handling these have already been explained in Mr. Kelly's series of articles. After the job envelopes, the customers' accounts were taken up, a page in the special Accounts Receivable ledger being started for each account outstanding. Each ledger entry was represented by an itemized bill on the customers' bill file. About two days were occupied in transferring the customers' accounts from the card file to the ledger, and checking up the corresponding items and totals on the bills. The cash receipt tags were also introduced at this time. From the Accounts Receivable ledger, the accountant proceeded to the Accounts Payable ledger, making entries from the voucher file for all accounts owing.

It is possible for any establishment to install this part of the system immediately, adopting the job envelope, the cash receipt tag, and the ledgers for accounts receivable and accounts payable without waiting until the system can be installed in its entirety. When these forms are in working order the remainder of the installation is a comparatively simple matter.

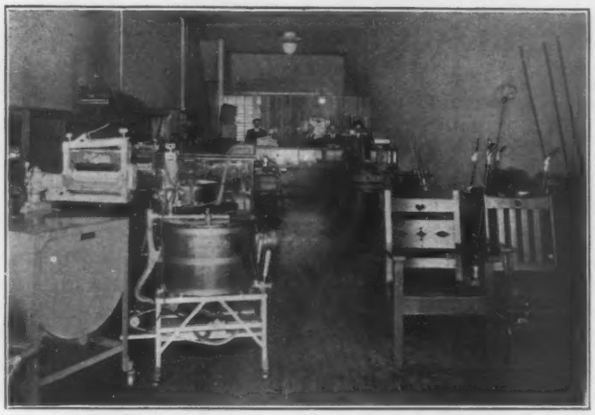
Following this part of the work a complete inventory was made of the company's assets, beginning with the least movable type, such as the furniture, taxes paid in advance, and so forth, and ending with the merchandise, both that in the store and that out on jobs. A compilation of liabilities completed the survey of the business, and the data was in shape for the introduction of the General Ledger for the double entry system, and the making out of the monthly statement.

A Simple Process

The work was started during November, and by the end of the month the complete system was in working order. Nothing had been upset. There was no sudden or drastic change as far as daily methods were concerned; only an adoption of some new forms, and a slightly different system of recording transactions. But the resulting array of facts provided a complete picture of the business as it stood at the end of the year, and on the monthly statement it was possible for the management to see at a glance just how much of every dollar received went in overhead, how much in actual cost, and how much was profit. Every financial factor in the business was in black and white; there was no element of guesswork and no element of uncertainty as to whether business was being conducted at a profit, or whether apparent profits were being neutralized by a large overhead.

The value of complete visualization of business conditions has often been offered as the major reason for the establishment of a comprehensive accounting system—and the experience of this company may be regarded as a realization of this argument.

All this had been accomplished quietly and inexpensively by the one expert with the cooperation of the management. The bookkeeper did not get brain fever, and nobody was confused by the new order. Incidentally, much credit is due to the Capitol Electric Company for the public-spirited attitude which made possible this highly successful official experiment, and for the wholehearted cooperation shown both to the electrical interests that instituted the idea and to the accountant who did the work. That the managers have not regretted their action is obvious to anyone who mentions the new accounting system to them. Asked how they like it, they regard you proudly, and remark, "Why, you couldn't take it away from us!"



As an example of what the Rocky Mountain Electrical Cooperative League has accomplished already, these two pictures of Dodge Brothers' (not the automobile firm) electrical shop show the store before and after remodeling under the suggestion and direction of the Cooperative League.

Work of the Rocky Mountain Electrical Cooperative League

(The spread of the cooperative idea in the electrical industry, as exemplified by the success of the California Electrical Cooperative Campaign, has gone ahead rapidly in the West. While not as wide in its scope as cooperative organization in some of the other industries it has, nevertheless, bound together the four branches of the electrical industry with the idea of giving better service to the public. The following account of the progress of the Rocky Mountain Electrical Cooperative League should be of particular interest to other industries, as there were special problems which had to be met in the inter-mountain districts.—The Editor.)

When the electrical interests in the intermountain district around Salt Lake City decided to start an Electrical Cooperative League, it was decided to pattern it very closely after the California Cooperative Campaign which had met with such success in California. Accordingly at a Get-Together meeting in the fall of 1920, where the thing was discussed in detail, an advisory committee was selected with four representatives from each of the four branches of the electrical industry in Salt Lake City. With this as a nucleus for the work, the next step was the selection of a field secretary. E. T. Millham, whose connection with the Utah Power & Light Company and the Hurley Machine Company in Salt Lake City had given him a broad familiarity with electrical problems, was chosen for this position. His first act was to come out to California where he spent several weeks with the various members of the Advisory Committee and field organizations of the California Electrical Cooperative Campaign, studying their problems and conferring with them as to the best methods of organization and procedure. Upon returning to Salt Lake City offices were opened in the Kearns Building and a contest was run in the daily papers with electric appliances offered as prizes for the best trademark, which would be adopted by the league. The effective symbol chosen is used on stationery, in all advertising and in the display windows of members of the league. In consequence the public is already familiar with the organization as an element for good. The next step was that of interesting the public in the idea of convenience outlets and consequently an advertising campaign or drive was started. This consisted of form letters sent out on the letterheads of the contractor-dealers with return postal card. These letters were educational and besides familiarizing the public with the idea of the convenience outlet and the name, it had the effect of bringing in good business through the contractor-dealers.

J. D. NICHOLSON, manager of the electrical department of the Mine and Smelter Supply Co. and a member of the advisory committee of the League, has been in the electrical industry in the intermountain district most all his life. Stay with it, J. D.

SIDNEY R. INCH, general manager of the Utah Power & Light Company, is a member of the advisory committee of the League. You have taught your men how to cooperate, S. R., so now teach it to the rest of the men in the industry.

EARL T. MILLHAM, secretary of the Rocky Mountain Electrical Cooperative League, is sold on cooperation and the "self-interest story." He is a hard worker and is full of pep and good ideas. Stay with 'em, Earl, and the "best o' luck."

WALTER A. MOSER, manager of the Salt Lake City office of Westinghouse, has been with that company since leaving college in 1907. He is a member of the advisory committee of the League and a big booster for better relations and understanding.

EDWARD H. EARDLEY, president of the Eardley Electric Company, is one of the contractor-dealer representatives on the advisory committee. If they start to waver, Ed, turn loose the old oratory and bring 'em back to the fold.

J. A. KAHN, president of the Capital Electric Company and president of the Rocky Mountain Electrical Cooperative League, did not need any cooperative movement to teach him the value of it. May the League prosper under your direction, Jake.

R. M. BLEAK, superintendent of lighting and appliance sales for the Utah Power & Light Company, is secretary and treasurer of the Rocky Mountain Electrical Cooperative League. After the first year they will want to increase their contributions, R. M.

JAMES S. WALKER, JR., president of the Walker Electric Company, president of the Salt Lake City Contractor-Dealers' Association, is another contractor-dealer representative on the advisory committee of the League. Use your authority, Jim.

P. M. PARRY, commercial manager of the Utah Power & Light Company and a representative of the power company on the advisory committee, an ardent believer in cooperation. He directs the company's policy in regard to merchandising sales. Make 'em cooperate, P. M.

STANLEY S. STEVENS, manager of Stevens Sales Company and district sales agent for Century Electric Company, a member of the advisory committee. Light the way for better merchandising, Steve.

The future plans of the League include an electrical range campaign, and work with the architects, builders and real estate firms for the purpose of thoroughly selling the idea of proper wiring of homes at the drawing up of the plans. To this end a special committee has been appointed which is doing good work, so that by the time house building starts again in earnest they hope that each new home will have sufficient outlets installed in them. The Electrical Home Idea is also being carried out along slightly different lines from those which distinguished the California Experiment. The Utah committee has been successful in securing the cooperation of an an individual owner who has arranged to build an electrical home for his own use, and who will permit its exhibit for a stated time as an electrical exposition. It is hoped that this will be ready for opening about September first. The work has been going forward also with the idea of introducing better merchandising methods into the stores of the contractor-dealers with very good results. Several of the stores have completely rearranged their interiors and two or three have moved to new and better locations.

In conjunction with one of the local newspapers the Rocky Mountain Cooperative Electrical League is holding a cooking school for a week, which it hopes to make into an annual affair. Details of this plan are given in another part of this issue of Journal of Electricity and Western Industry.

B. E. ROWLEY, sales manager of the Edison Electric Appliance Company, and vice-president of the Rocky Mountain Electrical Cooperative League. Talk up an outlet for every appliance, B. E.

CHARLES C. CAMPBELL, sales manager of the Intermountain Electric Company and a member of the advisory committee of the League. Make disciples of your salesmen, Charlie, to spread the good word.

CHARLES W. TALMAGE, manager of the Salt Lake City office, Western Electric Company, is a member of the advisory committee of the League. How about the telephone as an aid to cooperation, Charlie?

GEORGE R. RANDALL, president and manager of the Salt Lake Electrical Supply Company and a member of the advisory committee of the Rocky Mountain Electrical Cooperative League. More power to you, George.

ROBERT MILLER, local manager of the General Electric Company at Salt Lake City and a member of the advisory committee. Used to work in the laboratory at Schenectady. Analyze the situation, Bob, and then mix up the essentials for successful cooperation.

GUSTAVE W. FORSBERG, secretary of the Wasatch Electric Company and a representative of the contractor-dealers on the advisory committee of the League, has had long experience in the electrical contracting game. Stand up for a real profit on contracts, Gus.

HUGH M. FERGUSON, manager of Salt Lake division of the Utah Power & Light Company, is another power company member of the advisory committee. As you used to have charge of the steam sales, use the steam roller method if necessary, to get cooperation, Fergie.

A University Course in Practical Cost Accounting

BY PAUL B. KELLY

(Is your pocket your cash drawer? Have you any idea at the end of the day just what your extra cash stands for? The fourth article of the series on the Standard Accounting System outlines the methods of recording cash receipts of all kinds. This series is compiled by Paul B. Kelly, research accountant, under the supervision of Henry R. Hatfield, Professor of Accounting, and Dean of the Faculties at the University of California.—Editor.)

LESSON III
RECORDING CASH RECEIVED

A large percentage of business transactions occur when cash is either received or paid out. Therefore, it is important to establish a system of recording cash transactions which will be not only quick and easy, but also capable of giving the necessary data which a double-entry system of accounts demands. "Double-entry" demands that when cash is received we must make a notation of why it was received, and that when cash is paid out, we must record the purpose or object of the payment. The object of this lesson is to explain the best way of getting the preliminary data on "Cash Received" which is needed by the Standard Accounting System. Lesson IV will describe the best procedure for recording "Cash Paid Out." The manner in which this data is used in the accounts will be explained later in the course.

In almost all cases, cash is received by the contractor-dealer as a result of either:—

1. Cash sales, or
2. Payments received on customers' accounts.

Cash may be received for some other purpose, but such receipts are usually exceptional. The methods used in recording cash sales, payments on accounts, and miscellaneous cash receipts will now be described.

Method Used in Recording Cash Sales

A Cash Sale is an exchange of merchandise for cash. By using a special form of cash sale tag for such receipts of cash, the fact is easily recorded that cash has been received in exchange for merchandise. The form used for recording cash sales is Form No. 7—Cash Sale Tag. Cash sales tags should be written in duplicate as shown in the illustrations. In writing cash sales tags it is not necessary to write the customer's name and address.

The original is given to the customer or is wrapped with the goods sold. The duplicate is retained by the cashier. At the end of the day when the cash in the drawer is checked up in the manner which will be described, the cash tags are turned into the office and are costed in the manner illustrated by the duplicate cash sales tag. After being costed, all the cash sales tags for the day should be pinned together. A slip of paper should be placed on top of each day's tags showing the date, the total amount of the cash sales

ACME ELECTRIC CO.
(INCORPORATED)
ELECTRICAL CONTRACTORS and DEALERS
Wiring, Supplies, Repairing
Agents for G. E. Motors, Edison Mazda Lamps
PHONE BERKELEY 371 468 SHATTUCK AVE.

Berkeley, Cal., 12-25 1920

Name

Address

2	115V-50W White Mazdas	1	30
1	115V-75W Blue Mazda		65
		1	95

Form No. 7. Size 3¼ x 5. This is the original of the "cash sales tag." It is given to the customer in case of dispute and as an additional check on the cashier.

ACME ELECTRIC CO.
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ELECTRICAL CONTRACTORS and DEALERS
Wiring, Supplies, Repairing
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PHONE BERKELEY 371 468 SHATTUCK AVE.

Berkeley, Cal., 12-25 1921

Name

Address

2	115V-50W White Mazdas	1	30
1	115V-75W Blue Mazda		65
		1	95

88
44
Cost 1.32

Form No. 7. Duplicate of the "cash sales tag." Size 3¼ x 5. It is retained during the day in the cash drawer until the cash is checked up. Each day's tags are totaled and pinned together.

ACCOUNTS RECEIVABLE

NAME Mr. J. B. Stedman,

ADDRESS 2635 Sixth St., B'klyn

COPYRIGHT—NAT. ASSN. OF ELECT. CONTRACTORS AND DEALERS. FORM NO. 11-A

DATE 1920	FOLIO	DEBITS	✓	DATE	FOLIO	CREDITS	✓	BALANCE
12 31	1	122.38						122.38
				1-10-21		75—		47.38

Form No. 11. Size 9 x 8. This is the customer's account in Accounts Receivable ledger. Note how the payment recorded on the cash receipt illustrated has been posted. Also note the way in which the balance is shown after each transaction.

tags, and the total cost of the merchandise sold. The use of this data will be explained further on in the course.

Method Used in Recording "Cash Received on Account"

A payment of cash on his account by a customer is also an exchange. The contractor-dealer receives cash and in turn cancels all or part of his claim against the customer. By using a special form for cash receipts of this nature, the requirements of a double-entry system are easily complied with. Cash payments on their accounts made by customers are recorded on Form No. 9—Cash Receipt.

If the customer desires a receipt for a partial payment, this form is filled out in duplicate, and the original is given to him. Otherwise, only a single copy is filled out. Study the illustration of how a payment on J. B. Stedman's account has been recorded. The cash receipts are kept by the cashier until the cash is checked up. They are afterwards turned in to the office to be entered in the customers' accounts as will be described presently.

Method Used in Recording Miscellaneous Cash Receipts

In a few instances cash may be received for some purpose other than a cash sale or in payment of a customer's account. Such receipts are to be recorded on Form No. 9—Cash Receipt. The purpose of such miscellaneous receipts should be carefully noted on the tag. Study the illustration of how cash received in payment of interest on a mortgage held by the proprietor was recorded.

These tags are kept by the cashier until the cash drawer has been checked up. They are then turned in to the office to be perforated and placed on a file similar to the one used for customers' bills.

Recording Cash Receipts in Customers' Accounts

The payments by customers on their accounts are recorded on Form No. 9—Cash Receipt, in the manner described. At the close of the day, these cash receipts are turned in to the office to be posted in the Accounts Receivable ledger. Note in the illustration how the cash payment received from J. B. Stedman has been posted to his account. Payments by customers are always entered on the right hand, or credit side of the ledger page. Credit entries are always subtracted from the previous balance due from the customer. See how the exact condition of J. B. Stedman's account may be seen by a glance at the last figure in the "Balance" column. Keeping accounts "balanced" in this way lessens the work of getting out monthly statements.

After the cash receipts are posted in the Accounts Receivable ledger, a check mark is placed on them in the lower right hand corner as shown in the illustration. This check mark indicates that the cash receipt has been posted. The cash receipts are then perforated and placed on a file by themselves according to the date.

If it is thought desirable these cash receipts may be numbered to make reference to them more easy. If they are numbered, the number of the cash receipt should be placed on the ledger page in the column headed "Folio" at the time of posting. However, unless the business is very large, numbering the cash receipts is not necessary. In the exceptional cases in which it is necessary to refer to a cash receipt, it may be found without trouble by first looking in the Accounts Receivable ledger to find the date of the tag.

BERKELEY, CAL. 1-31-21

Mr. J B. Stedman,
2635 Sixth St, B'klg.

To ACME ELECTRIC CO. Dr.

WHOLESALERS OF ELECTRICAL SUPPLIES
ELECTRICAL CONTRACTORS
EDISON MAZDA LAMPS

488 SHATTUCK AVENUE PHONE BERKELEY 371

Jan 1,	1921	Balance	122	38		
Jan. 10,	1921	Cash Received on acc't	75	00		
Jan 31,	1921	Balance due			47	38

Form No. 8. This illustrates the type of monthly statement that is sent to the customer. Statements like this can be gotten out easily and promptly.

Checking Up the Cash Drawer

In order to discover mistakes or other losses in cash, the cash drawer must be checked up at the close of each day's business. A definite amount (say $50.00) should always be left in the cash drawer for making change. At the end of the day all the cash is removed from the drawer. The amount kept in the drawer (the $50.00) should be immediately put back. The remainder of the cash, together with the cash sales tags and the cash receipts for the day, should be taken to the office to be checked one against the other.

The actual cash received should equal the sum of the cash sales tags and the cash receipts. If it does not check, it is evident that there has been a mistake in writing a tag or in making change. Such discrepancies should be carefully investigated. If a cash receipt has been written for too small an amount, trouble and embarrassment with the customer will eventually ensue. If, on the other hand, a cash receipt has been written for too large an amount, or if a mistake has been made in making change, it means a real loss of money to the proprietor. The cash should be checked in this way daily; it takes only a few minutes to do it.

CHECK ✓ CASH

No. _____ Berkeley, Calif., 1-10 1921

ACME ELECTRIC CO.

Received from Mr. J. B. Stedman

Address 2635 Sixth St., B'klg

Seventy-five 00/100 Dollars

AMOUNT 75 00

On account? ✓ Other Purpose _____

Rec'd by L.J.M. ✓

Form No. 9. Size 5 x 3¼. This is the "cash receipt" used for recording payments on account. A duplicate is given to the customer if he wishes a receipt. The check mark in the lower right hand corner indicates that it has been posted to the credit of the customer in the Accounts Receivable ledger.

All cash received during the day should be deposited in the bank. This should be a hard and fast rule. It is observed by all progressive concerns. In the next lesson will be described a few little devices which will make it possible to deposit all money received in the bank, and to pay all money by check. When this procedure is established the bank becomes the check on the accuracy and honesty of the cashier.

Sending Out Monthly Statements to Customers

On the last day of the month, each customer should be sent a statement of account. This statement should show the changes that have taken place in the account during the month just ended. A statement of this nature also acts as a reminder of the debt. It is perhaps the most important factor in stimulating prompt payments.

The monthly statement of account is written on Form No. 8. This is the same form which is used in

CHECK ✓ CASH

No. _____ Berkeley, Calif., 1-15 1921

ACME ELECTRIC CO.

Received from Mr. John T. Warren

Address 923 Telegraph Ave., Bklg

Forty-five 00/100 Dollars

AMOUNT 45 00

On account? _____ Other Purpose Quarterly interest payment on mortage on his store

Rec'd by L.J.M.

Form No. 9. Size 5 x 3¼. This illustrates how the cash receipt is used for recording miscellaneous receipts of cash.

making out customers' bills. The monthly statement should be very condensed and brief. It should start out by showing the "balance" that was due at the beginning of the month. Next should follow a resume of the changes in the account that have occurred during the month. It ends by showing the "balance" due on the close of the current month. Look at the illustration of the Monthly Statement of Account sent to J. B. Stedman.

This course is conducted in connection with the Extension Division of the University of California, the complete text appearing in these pages. Students of the course may obtain supplementary material by application to:

Extension Division,
Room 301 California Hall,
University of California,
Berkeley, Cal.

Notice how easy it is to make up and mail these statements at the end of the month. No detailed statements need to be made up at this time because detailed statements were sent to the customer at the time the charge occurred. All the information needed for the monthly statement is obtained from the Accounts Receivable ledger. The envelopes are also easily addressed because each account page shows the address of the customer. The usual severe ordeal at the end of the month has been eliminated.

Note.—The Cash Sales Tag—Form No. 7, and Cash Receipt—Form No. 9, are not furnished as part of the Standard Accounting System. These forms bear the name of each concern and must therefore be printed locally. These forms may be obtained cheaply. Both should be made the same size so that they may be handled together conveniently.

The ledger pages for the Accounts Receivable ledger and a patent binder for these pages, however, are supplied as part of the outfit.

HOW TO DISTRIBUTE OVERHEAD EXPENSE

"Our cost systems are too inflexible," says a bulletin recently issued by the Chamber of Commerce of the United States; "under ordinary cost methods, still largely in use, overhead expenses are spread too thin in times of forced production, and massed too heavily in periods of slight demand and output, giving in the latter case costs that are artificially high and unfair to the public, and moreover costs which the market will not generally sustain.

"Cost systems should provide that these expenses, usually designated as overhead expenses, should be pro-rated on the basis of a normal year—the 100 per cent mark on the business thermometer. Thus in time of unusual production, production exceeding normal, the overhead should be more than used up in costs, and a surplus out of overhead cost created to take care of those times when the output is below normal, and the overhead charges not fully cared for in the costs of that year.

"To take a very simple illustration: Let us assume the normal output of a department is 100 pieces and the overhead $100, or an overhead charge of $1 per item. If the department produces 150 pieces at a normal overhead charge of $1 per item, not only will the $100 overhead be used up, but there will be an additional $50 as a reserve. When the output of the department drops to 50 pieces, only $50 overhead will be applied to this reduced production, and the difference made up from the reserve established during unusual production."

Problem Course in Electricity

BY H. H. BLISS

(Why do the batteries on your truck wear out? Can you tell how long a battery will last and what its voltage will be? The following article, the nineteenth of a series, deals with the whys and wherefores of batteries, giving practical data on their structure and use. The author is connected with the Riverside Junior College, at Riverside, California.—The Editor.)

ELECTRIC BATTERIES

Lead Batteries.—There are many makes of lead storage cells, most of which contain either "Planté" or "pasted" plates, the former being heavier and better adapted to station use while the latter are found on motor vehicles on account of their greater lightness and lower cost. The active materials on the Planté plates are formed by electrochemical processes from the pure lead backing; in the pasted plates the active material is applied as a paste to a frame or "grid" made of lead and antimony.

In the United States the great development of storage battery street vehicles began about 1904. Hundreds of electric trucks are now operating in the larger cities, calling for about 25 kw-hr. per truck per day for battery charging. Direct current power stations generally have storage batteries for helping to carry the "peak" or heaviest load of the day. Telephone central stations are equipped with storage batteries, which provide current for talking and for lamp signals, this "common battery" system having superseded the "local battery" arrangement. Storage batteries are to be found on all modern automobiles, being used for starting, lighting, and ignition.

Cells are connected (generally in series) to form batteries, the voltage of several in series being equal to the sum of the separate voltages. Since six-volt current is found convenient for automobile starting and lighting systems, and the voltage of a lead cell is about 2, the usual automobile battery has three cells. The typical telephone central office has a 24-volt battery (of 11 lead cells) for ordinary circuits and a 48-volt battery for long distance transmission.

Edison Cells.—When current is drawn from an Edison storage cell, the positive plate, nickel oxide, is "reduced" or changed to a lower oxide of nickel by the loss of some of its oxygen. At the same time the iron negative plate receives oxygen from the electrolyte and becomes iron oxide. The voltage gradually falls during this process, rising again when the cell is charged and the plates are changed back to their original state.

The Edison battery is much stronger, lighter and more durable than the lead battery. It is able to stand over-charging, over-discharging, neglect and physical shocks which would quickly ruin a lead battery. It has not succeeded in displacing the latter, however, partly because of its higher cost and partly because its greater internal resistance lowers its efficiency and gives trouble in certain applications.

Primary Batteries.—In dry cells and in almost all wet cells, except the "standard batteries" used solely for laboratory tests, the active material is the metal zinc. This is slowly destroyed as current is drawn from the battery, going into solution with the electrolyte. The cell is exhausted when the zinc is all used up or the solution has become so contaminated that it no longer attacks the metal.

It is a simple matter to calculate how many ampere-hours can be supplied by a battery before the zinc is completely consumed. For example, a 6-oz. zinc in a dry cell would be entirely destroyed by the time the cell had supplied 139 ampere-hours, since $6 \times 23.2 = 139$. (See the "Electrochemical Table" in the previous chapter for ampere-hours per ounce.) However, the electrolyte in a dry cell usually wears out before the zinc is gone, and the volts and amperes fall so low that the cell is thrown away.

It is possible to predict the voltage of a battery made with any two of the following materials and an electrolyte like sulphuric acid. The following table gives numbers indicative of the tendency each has to dissolve in this acid; if any two are used the voltage will be approximately equal to the difference between their numbers, and the one with the higher number will be the one destroyed by the battery action. It is found that the voltage does not at all depend upon the size of the plates employed or their distance apart.

Carbon	Silver	Copper	Lead	Iron	Zinc
.09	.39	.80	1.12	1.55	1.83

Hydrogen is set free from the electrolyte at the positive plate of many primary batteries. The bubbles of gas tend to cover the electrode and diminish the available current. This action is known as "polarization," and it is to some extent counteracted by the use of chemical "depolarizers" which unite with the newly formed hydrogen and render it harmless. Such depolarizers act slowly, so that the cell must be given frequent "rests," unless the chemical is so strong as to dissolve the plates when the cell is not working.

Internal Resistance.—Current must pass between the plates of a battery both when charging and when discharging, and in doing so it meets resistance in the electrolyte. This resistance can, by a simple test, be shown to be proportional to the distance between the electrodes and inversely proportional to their area. Hence the plates are made as broad as possible and set closely together. In a storage cell several positive and several negative plates are sandwiched together, being held from actual contact (which would short circuit the battery) by means of wood or rubber separators.

The current it is safe to draw from a battery depends upon the exposed area of its plates; lead batteries are often rated to give a steady current for eight hours at from 5 to 10 amperes per square foot of area exposed on both sides of all the positive plates in one cell.

If a voltmeter is connected to the terminals of a battery which is otherwise on open circuit, it will

read the true generated voltage. When current is allowed to flow, however, the meter is found to register a lower voltage, the drop depending upon the amount of current drawn. As in the case of a generator, the voltage drop = amperes × ohms, the ohms here being the internal resistance of the battery. Thus a dry cell with .05 ohm would read 1.5 volts on open circuit and 1.4 volts when 2 amperes flowed. At a current of 30 amperes the entire 1.5 volts would be consumed in internal drop and the voltmeter would read zero; in other words, the cell could give only 30 amperes on short circuit.

As a battery becomes discharged its internal resistance increases; hence its condition can be determined by noting the terminal voltage while current flows. (At the beginning of discharge a lead battery slightly **decreases** its resistance, due to the diluting of concentrated acid in the pores of the plates.) The following voltages were taken from typical storage cells, each discharged continuously at 45 amperes. The voltage was read at the terminals without stopping the current.

Time—	0	2 hrs.	4 hrs.	6 hrs.
Lead	2.13	2.07	1.96	1.65
Edison	1.43	1.23	1.18	1.00

Solutions for Previous Problems

201. Copper loss in armature = 102 × 102 × .15 = 1560 watts; brush loss = 306 watts. Total loss = 3520 + 1560 + 306 = 5,386 watts. Voltage drop in machine = 3 + (102 × .15) = 18.3 volts. Output = 100 × (600 — 18.3) = 58,200 watts. Efficiency = 58.2 ÷ (58.2 + 5.4) = **91.5%.**

202. 3412 × 5.4 = 18,400 B.t.u. per hour or 307 per minute. 307/750 = .41 B.t.u. to each cu. ft. of air; .41/.017 = 24° rise in temperature; 85 + 24 = **109° Fahr.** = final temperature.

203. One kw-hr. of loss produces 3412 B.t.u. of heat, sufficient to warm by one degree 3412/.017 = 200,600 cu. ft. of air. Hence a loss of one watt would heat by one degree 200.6 cu. ft. of air per hour or 3.34 cu. ft. per minute. Therefore 3.34 × the watt loss = no. of cu. ft. of air heated one degree Fahr., or **3.34 × watt loss = cu. ft. per minute × rise in degrees Fahr.** Applying this rule to the previous problem: 3.34 × 5386 = 750 × rise; rise = 3.34 × 5386/750 = 24° Fahr.

204. In one hour thickness = 80 × .054 = 4.32 mils; in 7 minutes it is 7/60 of 4.32 = **.504 mil.** This is about the thickness used in ordinary good work. Exceptionally fine plating may be 1 mil thick, while the cheapest articles may be coated with as little as ¼ mil of nickel.

205. **618 oz. = 38.6 lbs.**

206. One kw-hr. = 1000/6 = 166.7 ampere-hours at 6 volts; 166.7 × .1420 = 23.67 oz. = **1.48 lbs.**

207. For 160 oz. we need 7.04 × 160 = 1,127 ampere-hours; 1,127 × 6 = 6,750 watt-hours; 6.75 ÷ (.73 × .80) = 11.57 kw-hr. input to motor, costing **34.7 cents.**

208. 200 × .575 = 115 lbs. = 1,840 oz. of sodium. Then 1840 × 33 = 60,720 ampere-hours. 60,720/120 = **506 amperes.** And 60,720 × .0466 = 2,830 oz. chlorine or **943 cu. ft.**

Problems on Electrolysis
(Continued from previous article.)

209. Find the cost of producing 9,450 cu. ft. of hydrogen (weighing .09 oz. per cu. ft.) by an electrolytic process with a voltage of 2 volts. The cost of energy delivered at the bath is 1.5 cents per kw-hr.

210. In 72 hours a copper plate in an old style electrolytic meter gained 8.7 oz. in weight. What average current flowed through the meter if the electrolyte was copper sulphate? (Such a meter consisted simply of a plating bath connected in series with the customer's load; the charge was based upon the change in weight of the copper plates which constituted the anode and cathode.)

211. Find the number of cubic inches in an ounce of lead from the second column of the Electrochemical Table. How many cubic inches will be deposited by one ampere-hour? How thick would this amount of lead be if spread over 144 sq. in.?

Battery Problems

212. An experimental battery is made of a 5-oz. plate of silver and a 20-oz. plate of lead in a tumbler of dilute sulphuric acid. What voltage does it generate and how long will it last if .3 ampere is continuously drawn from it?

213. The internal resistance of the above cell is found to be 1.4 ohms. What is the terminal voltage when .3 ampere flows?

214. A battery of 40 cells supplies a current of .1 ampere continuously for 8 weeks. How many pounds of zinc are consumed?

215. The lead cell whose discharge voltages are listed in this lesson gave 2.19 volts on open circuit at the beginning of the discharge. What was the internal resistance then?

216. The resistance after 2 hours was .0011 ohm. Find the open circuit voltage at that time.

217. At 5 hours the ohms of this cell rose to .0017; the open circuit voltage was 1.96 volts. Find the terminal voltage of 45 and 140 amperes.

The Man in the Plant

BY E. GIVENS

(The morale of an organization, like its reputation, does not depend on a few of its high officials, but on every individual who is a part of it. Fairness and encouragement from above tend to create in the ranks a cooperative and honorable spirit which is one of the best assets a company can have. The chief electrician of the Redondo steam plant of the Southern California Edison Company here presents this subject from the viewpoint of the man in the plant. —The Editor.)

In the days gone by it was thought that the man who could put a fire under a boiler, open an engine throttle or close a switch was good enough to operate a power plant, and of course this kind of labor could be had cheap but was costly at half the price. We are beginning to see the light—that the best men are the only kind we need to handle the high-priced machinery installed in our stations, and the best way to get this class of labor is by educating our own men in the way in which they should go.

There is an old saying, "Get 'em young, treat 'em rough and tell 'em nothing." This was said about another phase of life, and it does not work there either. We all know that, to a certain extent, this has been the policy that has been carried out in our line; that is to say, we have almost always got them young, and some foremen had the idea that if they did not treat them in good old rough stuff manner, the man might get the idea he knew more than the boss — and maybe he did, in which case

our good friend foreman would have some trouble in holding his end up.

I will admit that a foreman sometimes gets the reputation of being hard to approach for the reason that he is busy when the man comes to him with an idea, and speaks shortly. Whereas, if he would tell the man right off the bat that he is busy, in as pleasant manner as he can, and that he would like to have him come in a little later—noting on his date pad that the man wishes to see him—relations would be less strained between them. The man in the plant is the biggest job the boss has to tackle, and will make or break not only the boss but the company itself.

Our motto should be, "Get them young, treat them with kindness and give them every assistance to learn what is what about their duties." Working conditions should be of the best, with good sanitation and illumination. There should be a clean, decent place where they can change their clothes, so that when they are on their way home they will stand out as workmen from a clean plant, doing clean, honest work.

Suggestions Should Be Encouraged

The Man in the Street looks not only at our plant buildings and grounds, and our pole lines, but also at the type and condition of our workmen. If he sees a bright, clean, intelligent class of men leaving our clean plants, it gives him a good impression. All men must have self-respect to amount to anything. They may be poor in this world's goods, but if they have self-respect, they are all right. A man who has had an education will keep his self-respect even if he has to quit the place where he is working because some foreman tries to browbeat him when he offers a suggestion as to a better way of doing some class of work. If the suggestion has any merit at all, the man should be allowed to tell about it, for a man who receives a loud-mouthed, hasty answer and who is made to feel that he is a fool to use his brain, will not lay himself open to this kind of reception again. But if he is met with a pleasant word, which costs nothing, he will come back again, even if his first suggestion was not the world-beater he thought it.

I do not mean that the chief should have to listen to all the suggestions that are made, but the department foreman should have his men's interests at heart, and should look into their suggestions. If they have merit, or if he is not well enough versed in the idea, he should then take the matter up with the chief.

And now for the kernel of the nut. The man in the plant who makes the suggestion must be given the credit. The man who climbs on other fellows' backs gets a hard fall some day. He is building his foundation on sand, and when the man in the plant finds out that his ideas are being stolen, and that the other fellow is receiving credit which rightfully belongs to him, he will have no more ideas for that man.

If the chief takes the blame in case the suggestion fails, the man in the plant knows that he is a square shooter, for it is really his failure as well as the man's. Both were trying to better conditions, and that is exactly what is needed in any business.

I think the man in the plant is one of the most important units in the organization, and every effort should be made to get the best out of each man who comes into it. Card index him, as we do at this station. Find out his ability, and what he has been doing. Remember that we use every kind of brains in our business. There are few trades which we do not use in serving the man in the street. Put him where he can be used to the best advantage, at his trade if possible, but if not, then at the next best thing. Record his progress and speak of it. Some other department may need just such a man. Remember that it costs money to teach a man to operate our high-priced machines, and if we are to get the best results out of these machines, we must use only the best operatives and treat them accordingly.

The man in the plant is usually above the average in intelligence, for the man who has had no education is a very suspicious animal and does not want to work around anything which he cannot see. In the class of men we get, we have something to start with, and can educate all of them in their several duties.

The Boss

To whom do we all look for example? The boss. He must be just and fair, tempering justice with mercy, remembering the mistakes he made when he was climbing. He knows how badly he felt when he overlooked something, and the man who makes mistakes now feels badly just as he did then. Any foreman can fire a man, but is he saving the company money by letting him go? He has probably been discharged himself at one time or another when he did not have it coming to him. He knows how it felt. And it costs money to teach new men what the discharged man already knew, and none but the worst of men make the same mistake twice.

The Department Head

The department head is on his way up either on sand, or a firm foundation. He must have the respect of the men under him and must see that they are treated fairly. He must not assume the attitude of a little tin god before whom all men in the department must bow. He must never hurt a man's feelings by holding up his mistakes to ridicule. He needs every man in that department to help him hold his job. As long as the men are doing their work properly, let them alone. Do not always be issuing orders. Advice given in a friendly way does not cost any more and has a better effect on an intelligent man's mind. You have not ordered him to do a certain thing. You have simply offered a suggestion. He is doing it. Deep down in his mind he knows it was an order, but he likes to think he is doing it.

The Workman

The honest workman, when he makes a mistake, owns up to it and takes his medicine, good or bad. Let it be the best we can give him. His kind is not as scarce as you would suppose. We have lots of them. Education will make more.

The dishonest workman tries to cover up his mistakes by putting the blame on the other fellow, and does no more than he has to to hold his job. Get rid of this kind as soon as you can. By doing this you are really doing him a favor, for after a while he will see that it is the honest workman who gets the job he wanted and will try to make good honestly. Let it be known that all men must be honest in their dealings with each other, that each man must hold his job fairly.

There is an old saying, "Save the pennies and the dollars will take care of themselves." We should change this a little and say, "Save the man by fair treatment, by giving credit where credit is due, tempering justice with mercy and by education, and the organization will take care of itself."

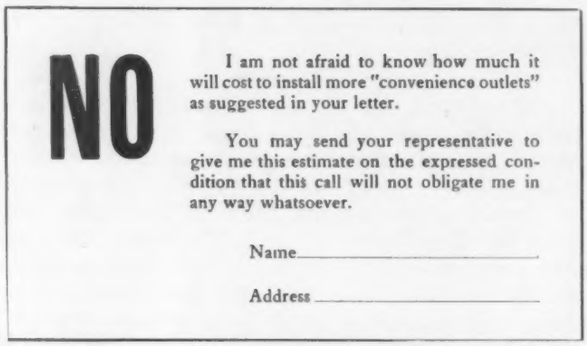
How to Get Over Convenience Outlet Campaign to Consumer

BY EARL T. MILLHAM

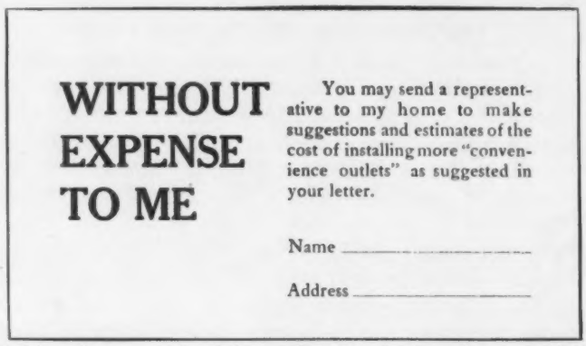
(The success of a convenience outlet campaign depends upon the extent to which the idea is sold to the consumer. The idea can be put over by the "Electrical Home," and by street car and newspaper advertising, but the Rocky Mountain Electrical Cooperative League used a direct advertising campaign to bring the idea of convenience outlets to the consumer before starting an electrical home. The author of this account is secretary of the Rocky Mountain Electrical Cooperative League.—The Editor.)

Since the Rocky Mountain Electrical Cooperative League was started in the fall months, and at a time when there was practically no new building going on, it was decided to educate the public in the matter of building outlets by a system slightly different from that used by the California Electrical Cooperative Campaign. It was not feasible to start an electrical home, but it was thought necessary to start talking about convenience outlets so that the public would fully understand the term and appreciate exactly what it meant. Then when the electrical home was started they would more readily appreciate the convenience of the baseboard outlet and floor plug, and would spend some time studying these in the electrical home when it was opened rather than walking around and admiring the electrical appliances shown. For after all the idea of the electrical home is not to display a group of diversified appliances but to sell the convenience of the baseboard and floor outlet, and the necessity of the home being liberally supplied with them if the greatest comfort is to be derived from the use of electrical labor-saving appliances.

Therefore the first work undertaken by the Rocky Mountain Electrical Cooperative League was the advertising campaign to sell the name and idea of the convenience. This was accomplished by direct advertising in the newspapers by the contractor-dealers and the power company, and by a liberal use of street car cards by the Utah Power and Light Company, the only central station operating in that territory. The contractor-dealers then started a campaign of direct advertising by mail, using a form letter personally signed, drawn up by the campaign, and their own letterheads. In each letter was a return postal card. A series of four letters was used, each letter following the other after a week's interval, and each dealing with a different phase of the convenience outlet story.


NO
I am not afraid to know how much it will cost to install more "convenience outlets" as suggested in your letter.
You may send your representative to give me this estimate on the expressed condition that this call will not obligate me in any way whatsoever.
Name
Address

Return postal card which accompanied letter number one of the series sent out by Salt Lake City contractor-dealers to boost convenience outlets.


WITHOUT EXPENSE TO ME
You may send a representative to my home to make suggestions and estimates of the cost of installing more "convenience outlets" as suggested in your letter.
Name
Address

Postal card accompanying letter number two played up the appeal that service would be rendered by the contractor without cost.

The first letter was a general introduction of the subject, explaining just what a convenience outlet consisted of, and telling some of the benefits to be derived from having them installed in the home. The letter read as follows:

When you attach your vacuum cleaner, electric iron or other labor-saving appliances, do you have to go to the bother of standing on a chair, unscrewing the light globe or taking down a shade? And sometimes breaking either or both.

You'll never know electric appliances at their best till you have fully equipped your home with extra "convenience outlet" sockets in the wall or baseboard into which you can conveniently screw the cord connectors.

Just think, for example, of how baseboard outlets in any room, simplify the use of the vacuum cleaner. It's as easy again to connect up and operate.

In the kitchen an extra wall "convenience outlet" will find almost daily use for the electric iron, coffee grinder, dish washer, ice cream freezer, cake mixer, etc.

And even if you have but one of these appliances now, think of the saving of steps and energy in a week's work.

More such "convenience outlets" can be quickly and easily added at any time—in old or new homes. The cost is reasonable compared with the benefits to be derived. No muss or fuss is necessary when installing.

We will gladly furnish, free of charge, helpful suggestions for equipping your home, and an estimate of the cost of installations.

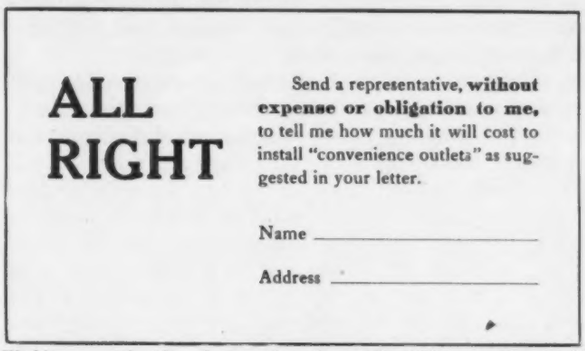
Please sign and mail the enclosed stamped and addressed post card and a representative will call—entirely without obligation or expense to you.

Letter number two dealt with convenience outlets in the dining room, and just hinted at the need for more outlets in the bedrooms, bathroom, kitchen and laundry. The full text of the letter was:

How is your home equipped for connecting up electrical labor-saving devices? Surely you have a number of such appliances in your home.

Just imagine the convenience of well-placed baseboard and wall outlets where you can quickly and easily insert extra plugs—when you need them. Extra "convenience outlets" in your home eliminate much loss of time and energy for the busy housewife who now has to unscrew light globes, remove shades and otherwise interfere with the lighting arrangement before she can put her electrical appliances to work.

In every room in the house extra baseboard and wall "convenience outlets" will do invaluable daily service once they are installed. Start with the dining room, if you wish. Install an extra wall outlet near the buffet for connecting up the chafing dish, toaster or percolator. How easy it will then be to keep the meals warm or to cook a simple breakfast or light lunch right at the table.


ALL RIGHT
Send a representative, without expense or obligation to me, to tell me how much it will cost to install "convenience outlets" as suggested in your letter.
Name
Address

Working upon the idea of suggestion, the postal which was sent out with letter number three assumed that the customer was sold.

In the bedrooms, bath, kitchen and laundry, there are daily needs for extra outlets.

At any time, even after the house has been built, more of those "convenience outlets" can be easily added. Let us show you how.

It will cost you nothing to sign and mail the enclosed stamped addressed card for a representative to call. There will be no obligation to you.

The bedroom was the subject of the third lesson in convenience outlets, and the list of appliances that could be used more conveniently by having convenience outlets was one of the selling points of the letter:

You have some wonderful electrical conveniences in your home—but what about "convenience outlets"—extra sockets into which you can quickly insert plugs for your electric iron, vacuum cleaner, etc. Can you snap your cord connectors to the live wire, instantly, without unscrewing lamps, standing on chairs, removing shades or other fuss or bother?

Extra outlets, conveniently placed, make for fewer steps and less work for the busy housewife. Moreover, well-placed wall and baseboard outlets enable you to bring into instant use many electrical conveniences which generally have been considered practical only in the most elaborately equipped home.

For example, consider the bedroom. Cheerfulness and comfort will be greatly increased by a wall outlet near the dressing table for the curling iron, drying comb, vibrator, etc. An outlet near the bed is most convenient for connecting up the reading lamp, heating pad or baby milk warmer.

The transformation which can be brought about by the installation of "convenience outlets" in the other rooms of the house, is just as remarkable.

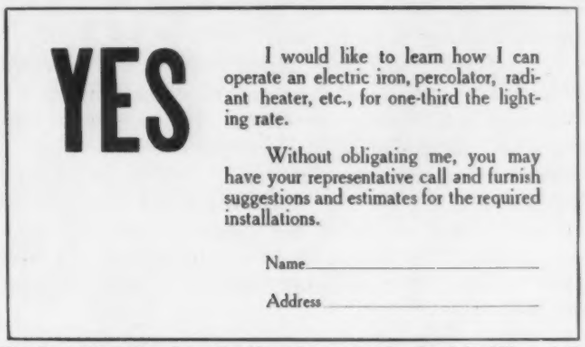
We will gladly send a representative to your home free of charge to explain in detail where and how these outlets can be installed. All you have to do is to sign and mail the enclosed stamped addressed card.

Remember, there's no obligation, no expense attached. Let the card come forward today.

The concluding letter of the series went into the saving made possible by having the baseboard and floor outlets on a separate circuit, with the circuit tied into the heating circuit meter and paying three cents per kilowatt-hour instead of the nine cents required when appliances are used on the lighting circuit. The idea of convenience was also sent home for the final drive:

How much do you pay to operate your electric iron, toaster, percolator, milk warmer, heater and other electrical cooking and heating appliances?

If you simply connect these conveniences to an ordinary light socket, the cost is NINE CENTS per kilowatt-hour. On the other hand, if you install extra wall and baseboard outlets connected to your fuel meter circuit, your current for operating these cooking, heating, and other appliances will cost just one-third as much, or THREE CENTS per kilowatt-


YES
I would like to learn how I can operate an electric iron, percolator, radiant heater, etc., for one-third the lighting rate.
Without obligating me, you may have your representative call and furnish suggestions and estimates for the required installations.
Name
Address

The final letter played up the idea of a saving in the light bill, and the postal sent out with it followed up the same idea.

hour. This is the same rate which you pay for power to run the electric range.

But there's another reason why you should install more outlets in your home. That is convenience.

Of course you can go to the bother of standing on a chair, unscrewing a light globe or removing a shade every time you use one of your electric appliances, if you want to. But why do it when extra outlets can be so easily added? How much better it is to have specially installed plugs for that purpose! Look over very carefully the enclosed booklet.

Extra outlets can be added any time. Will you let us send a representative to tell you, **at our expense**, how easily these can be installed?

Remember, this call will cost you nothing. You will be under no obligation for your trouble. What do you say? Give us your answer on the enclosed stamped and addressed card. If you are not ready now, KEEP THE BOOKLET for future reference.

The result of this campaign was to acquaint the public with the idea of the convenience outlet and to acquaint them with the term. The returns to the contractor-dealers in the installation of more outlets was as satisfactory as could be expected, and while all the homes in Salt Lake City are not complete electrical homes, interest has been started in the convenience outlet, and when the electrical home is started it will probably prove easier to clinch the idea than if there had been no preparation of the ground for the seed.

How to Own Your Own Light and Power Plant

BY SYDNEY W. GREEN

(When investing in power company securities, has it not been the practice to stress the benefit to the power company rather than the benefit to the individual consumer? The author, who presents in the following article some new ideas on this subject, is connected with the San Joaquin Light & Power Corporation.—The Editor.)

A bright young stock salesman representing one of the large power companies of California and whom we will know by the name of Bond, called on his friend Holmes, who a short time before had taken possession of his new residence on a beautiful shady drive in a prosperous agricultural city.

Holmes was justly proud of his new home. It represented an investment of $12,000, and in construction and design was a model modern house.

"Want you to see the wiring," said Holmes, leading Bond into an airy basement where a system of conduits led to floor and baseboard outlets in various parts of the house. "Four outlets to a room and extra outlets in the kitchen and dining room. Provision has been made for every known electrical convenience, as well as other comforts that go toward making a real home."

"I've been thinking about your modern electrical home and I want to congratulate you on its completeness," remarked Bond, "but there is one angle in connection with an electrical home that I want to bring to your attention." "No,"—as Holmes straightened in his chair and faced Bond—"you have not overlooked anything the electrical dealer has in his catalog. The new angle I have in mind is a power plant to supply the necessary energy to operate your appliances."

"Oh, I have gone into all those contraptions, but I never saw one I would have on the place. Too much bother and expense. All right for a home out in the sticks where the power lines don't touch, but no good in the city," answered Holmes, resuming his complacent ease.

"Holmes, if I were to put up a proposition to you whereby I agree to install a power plant large enough to take care of your electrical needs, clean, silent, absolutely reliable day or night, no trouble or care required, nothing to wear out, at an initial cost to you of $1,970 and no further costs for maintenance or upkeep, what would you say?"

Holmes studied Bond for a full minute to determine whether the proposition were real or a jest. He ran over the points brought out by Bond—"clean, silent, no care, always ready, no upkeep or expense, all the electricity he would need, total cost $1,970."

"Can't be done," was Holmes' laconic way of dismissing the subject.

"I can show you that it can be done," said Bond. "It will do what I have said and more. But let's get down to business. Will you pay $1,970 for a plant such as I describe providing it fits your power needs in this home? You need not pay all cash. Your note is good at the bank or you can pay in ten monthly payments if you choose."

After some rapid figuring Holmes concluded that a plant that could supply his home with electric power would be worth the investment.

The bills showing the number of kilowatt-hours and cost of power needed to run the home were produced, showing an average of about $10 per month, at the regular domestic light and heating schedule.

"You can use more power than is shown on these bills if you buy the plant I want to sell you," said Bond.

"All right, Bond, I will take your proposition providing it fills my needs. Now go ahead and tell me all about it."

"Holmes, I told you I would sell you a plant large enough to take care of your power needs for $1,970. Here is how I can do it. You know about that wonderful new hydroelectric plant the San Joaquin Light & Power Corporation completed last fall?"

"Do you mean the Kerckhoff Plant at Auberry?"

"That's it. Well, that plant and ten other plants on the San Joaquin power system are the plants that I will sell you for $1,970. Of course, I know you will not require all the plants on the San Joaquin system to furnish the power you want in this little home of yours, but you have the advantage of all this great string of plants to assure you of a steady supply of power. One plant might go out of commission, but with ten you are reasonably sure your power will be constant."

"But I am not in the market to buy the San Joaquin Light & Power Corporation."

"Certainly not. You wouldn't know what to do with it if you could buy it. But you have just told me you are in the market for a supply of power and that is just what I am here to sell you. I want to sell you an interest in this great hydroelectric plant upon the San Joaquin River. You were interested when I suggested a plant sufficient to take care of your needs and you pictured to yourself having this plant here on your premises. Instead of having the plant here in your home where it might prove more or less a nuisance, I will sell you an interest in the water-power plant located high in the Sierra Nevada mountains where it can use the water coming down the San Joaquin River just like perpetual motion, and transmit the power over a thin wire to your home where it requires only the touch of a button or the turn of a switch for your use. Instead of owning your plant individually, you will own this highly efficient plant in company with thousands of other consumers.

"This is how it is done. You buy twenty shares of San Joaquin Power Prior Preferred stock which represents ownership in the San Joaquin Light & Power Corporation. Dividends from twenty shares of this stock, amounting to $35, are paid every three

months. If your power bill is $10 per month, these dividends will yield enough to pay your power bills and leave a balance of $5 every three months which may come in handy in offsetting some heavy power bill. So you see an investment of $1,970 in a power plant will give you your light and power.

"And it will do more. If you purchased a power plant and operated it yourself, you would find it necessary to 'write off' a certain percentage each year for depreciation. At the end of eight or ten years, the possibilities are that you would receive nothing for this plant if you were to sell your home. Instead of a depreciation at the end of eight or ten years' use, the power plant you buy from me will be worth as much as the amount you paid for it, with a strong possibility of more, because I am selling these shares at a discount of $1.50 per share, or $30.00 less than par on the twenty shares. It should easily be worth par in eight or ten years' time.

"Now," continued Bond, "you see what I am selling you. Not a stock proposition, but an interest in a highly developed and highly necessary business that you need in your home. And the money received from the sale of stock goes into more power houses to make your buy even more secure."

"Bond, you can connect me up this afternoon," said Holmes, seating himself at his desk and drawing out his check book.

How to Sell Washing Machines

BY W. B. STODDARD

(The electrical dealer frequently finds the washing machine a rather cumbersome piece of merchandise both for display and selling purposes. The following article describes some devices which have been successfully used in this type of merchandise and will be helpful in suggesting new ideas.—The Editor.)

It is not enough to "keep" electric washers in stock—they must be "sold," and in order to sell them the dealer must acquaint the public with their good points. In order to determine upon which class to concentrate one's efforts, it is well to compile a list of desirable prospects.

A Successful Contest Device

An excellent method of accomplishing this is that adopted by Haskins & Elliott of Vancouver, B. C. This firm offered a prize of a 1920 model bicycle to the boy or girl sending in the largest list of names and addresses to which washing machines were afterwards sold. These lists were entered in loose leaf books, a page being given to each name and address, with the name and address of the sender in the upper corner. Each list as it came in was compared with previous ones, so as to avoid duplication, the credit being given only to the first party sending in a given name. At the end of the season it was an easy matter to determine the winner, as it was necessary only to go over the lists of sales and see which contestant had sent in the greatest number of valuable names. The lists turned in provided a splendid field for the salesmen, as practically all the names were those of people who had at least partially made up their minds to invest. There was no deadwood to be weeded out, since there was no object in padding any list; it was made clear from the beginning that the award was to be made not to the sender of the biggest list, but to the one against whom most sales were recorded.

All prospects were solicited first by letter, and then by a personal visit from one of the salesmen, who asked permission to make a demonstration at home—without any obligation on the part of the householder. The boys and girls, too, assisted enthusiastically in the sales, knowing their success depended upon it, and everybody on their list was besieged in season and out to go and look at the machines, to have them demonstrated, and what was most important, to buy.

The Selling Power of the Window

Once the salesmen have been put to work on definite prospects, the firm should devote considerable space to general advertising, in order to let the general public know what it is missing by not using the electric machines. One of the most concise and effective specimens of publicity along this line was a recent spread of the Newbery Electric Shop, Los Angeles, two of their most effective ads reading as follows:

"A WOMAN'S WORK, GRAVE SIRS, IS NEVER DONE"

The least we can do is to help make her work easier—to lighten the labor that household work involves. How often have you heard the old saying, "A woman's work is never done"?

So many of the women are doing the work that a machine can do better and easier and quicker—washing and ironing, for instance. It is not economy to wash and iron by hand in this day and age.

The electric washer and wringing machine saves a woman's health; saves the clothes, which is quite an item in these days of expensive fabrics; and saves laundry expenses—which figures alone will soon pay for the machine.

NEWBERY'S

LET THE ELECTRIC WASHER MAKE MORE SPARE HOURS FOR YOU

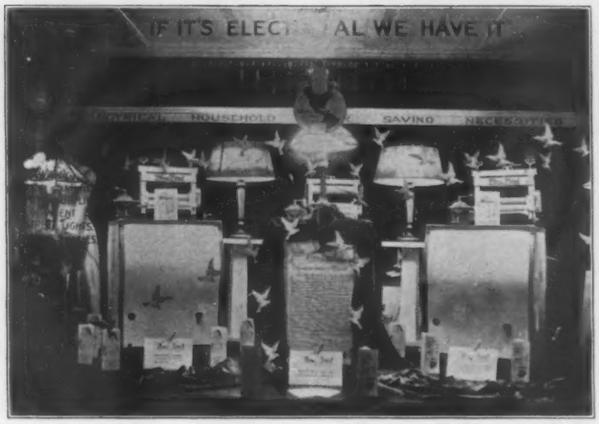
This, of all times and seasons, is ideal for the outfitting of your home with modern electrical machinery that will make life easier and happier, save time and strength, conserve food and fuel, and give you more time for rest and recreation. Come to

NEWBERY'S

and let us show you how easily and pleasantly you can do your washing with an Electric Washing Machine.

A Laundry Demonstration

Outside the store there was a big red circle painted on the pavement, within which was printed: "Buy an Electric Washer, Wringer, or an Electric Iron at our Laundry Helps Sale." A trail of red paint ran from the circle to the baseboard of the window, up the baseboard and glass to a circle on the pane, in which was printed: "Two Dollars a week pays for this great convenience." Inside the display window, a red ribbon ran from the circle to the machine itself.



A special Blue Bird display in one of the windows of the Newbery Electric shop, Los Angeles, the entire design being carried out in blue and white, with a touch of gold.

A unique window display in the store of the Burton Electric Company, San Diego, with a strong human interest which never fails to arrest attention.

The laundry exhibit being placed well to the rear, it was necessary for visitors to pass through the greater portion of the store, which was attractively lighted and various lines of merchandise displayed so as to show off to the best advantage. In this way many people entering the store for the first time saw something that interested them, and even if they did not purchase at the time, made a mental note of it for future reference. Every thing in the electric laundry was spotless—the electric range, the washing machine, the fan for drying clothes, the electric iron. At certain hours of the day a demonstrator showed the use of the washer and the ease of operation with an electric iron.

The window displays used to back up the laundry supplies campaign were decidedly effective. The first showed an ironing machine, operated by a wax model. A large card in front of it advised: "Costs less than three cents per hour to operate. A big ironing can be done in 90 minutes. Puts a beautiful gloss on the linens. Smoothes out every wrinkle in a lady's blouse. Irons anything from a handkerchief to a sheet." At the other side was a washing machine and wringer, and down in front of it the washer parts. A card in front of it bore the "Two cents per hour cost of operation" guarantee. Hung on a line in the rear was an embroidered table spread, ironed by the electric ironer, and occupying the center of the display was a card outlining the $10.00-a-week payment plan for either washer or ironer.

Specialized Displays

For beauty and attractiveness it would be difficult to surpass the second window, devoted entirely to featuring the Blue Bird line of washing machines. Suspended by fine wires all across the window were life size bluebirds made of cardboard. In the center was a framed card guaranteeing to replace any damaged or broken parts in the machine for the space of one year. This frame was draped with a scarf of dull gold velvet, extending down across the floor and up over pedestals at either end. On the pedestals were electric lamps with art glass shades, and a woman in a blue and white dress adjusting one of them. On either side of the guarantee were Blue Bird washing machines with wringer attachments.

Another make of machine is very effectively advertised by the Burton Electric Co., San Diego, Calif. At one end is a bench covered with brilliant red and green paper, on which is an old fashioned wash tub, over which bends a man's figure in sunbonnet and water-splashed clothes. In front of the tub is a card "Never Again." At the other side is an electric washer in operation, a mirror being suspended above it at such an angle that the churning suds are visible to the passer by. Between the two are life size cut outs of woman and boy standing by another electric washer. A large card calls attention to the advantage of an improved washing machine:

NINE O'CLOCK!
And Your Day's Washing is Completed
If you use one of our latest type washing machines
ELECTRIC—OF COURSE

HYDRO AND THERMO ELECTRIC PLANTS PLANNED FOR PORTUGAL

According to a notice published in the Boletim Official, the Portuguese Ministry of Commerce and Communications has appointed a special commission for studying and reporting upon the advisability of establishing a central plant for the generation of electric power.

This commission will investigate the following propositions:

1. To determine the possibility and utility of the Government interesting itself in this matter to the extent of building a national plant for the distribution of electric power.
2. To fix the possible production and the means for effecting the same in both hydroelectric and thermoelectric plants.
3. The desirability of the Government participating with the companies which have already obtained concessions for construction and exploration of such power plants.
4. The possibility of establishing a network of plants with the help of the railways and hydroelectric companies.
5. The principal basis for legislation authorizing governmental action along the lines outlined above.

These matters will probably be discussed in connection with the other projects for the utilization of the water power of this country for generating electricity.

SPARKS—Current Facts, Figures and Fancy

(How many peons do you support? You can find out by reading the interesting items below. Incidentally you may learn of the amount of wheat, oil and copper produced by certain industrious humans, and the amount of grain, fruit, and cotton destroyed by equally industrious insects; of underground movements in Paris and Tokyo; and of almost everything else, from the marine consumption of fuel oil to the toy balloons and nervous cows.—The Editor.)

Baled cotton may now be made flame and spark proof by treatment with a chemical compound.

* * *

Tourists, it is estimated, spent 800,000,000 lire per year in Italy before the war, and are now bringing in as much as 1,000,000,000 lire.

* * *

There are more than one hundred and seventy miles of wires used in the lighting system of the White House, and 3,000 incandescent lamps.

* * *

Chile produces 100,000 tons of copper per year at the present time, and has extensive mineralized regions, including large deposits of copper, as yet untouched.

* * *

Ohio is famous for something else besides presidents. This state manufactures about 1,500,000 toy balloons daily, from 50 to 75 per cent of the output of the United States.

* * *

Wheat production in the United States amounted to 787,000,000 bushels in 1920, exceeding the production of any other country, and amounting to 100,000,000 bushels more than the pre-war average.

* * *

The increase in marine consumption of fuel oil is shown by the fact that in 1918 Shipping Board vessels and the U. S. Navy combined consumed about 942,000 barrels, while in 1920 the consumption was 8,086,000,—nearly nine times as much.

* * *

A new expense in connection with aviation has been discovered by certain pilots. Suits were filed against them by a man who claims his livestock is scared to death by passing planes. The motorist who is continually paying the funeral expenses of feeble-minded poultry will sympathize with the pilots.

* * *

A total of 11,782 commercial ships had passed through the Panama Canal up to January 1st of this year. Of these 4,362 were of United States register, 4,143 British, 821 Norwegian, 474 Chilean, 422 Japanese, and 376 Peruvian; the remaining 1,102 were of 25 different nationalities.

* * *

An underground moving pavement is contemplated in Paris, to relieve the congestion of passenger traffic at busy hours of the day. The pavement would follow the line of the Grands Boulevards, which are not served by an underground railway. The public would be admitted in the same way as to a railway, by means of tickets, but as it would never be necessary to wait for the pavement it is presumed that the latter would be less crowded. From the description, however, it appears that there would be "standing room only."

* * *

There are 362 oil wells in Mexico now producing. The official figures show that the quantity of oil now being produced is approximately 600,000 barrels daily. There are 707 wells now in course of drilling. There are 184 wells producing more than 500 barrels daily.

* * *

Insects in the United States are said to have destroyed, last year, among other things, grain worth $430,000,000, cotton worth $140,000,000, tobacco worth $17,000,000, and fruit worth $141,000,000. And we thought we had the prize "destruction statistics" when we received the estimate of the losses by fire.

* * *

The gum-chewers of the United States provide employment for about 3,000 peons in the neighborhood of Campeche, Mexico. These workers are employed in gathering the chicle for the manufacture of American chewing gum. The industry supports three-fourths of the population of the city of Carmen, and a somewhat smaller proportion of the population of the city of Campeche.

* * *

Thirty miles of subway lines are being planned for Tokyo. The suggestion was first made in 1918 with a view to relieving the traffic congestion which has become severe, but the idea was opposed because Tokyo is built on land reclaimed from the sea. A company which has made recent tests, however, maintains that the construction of a subway is perfectly practicable. If the plan is carried out, Tokyo will have the first underground railway line ever built in the Orient.

* * *

The railway mileage of the world by continents is as follows: America, 364,745; Europe, 218,628; Asia, 70,913; Africa, 29,921; Australia, 22,523. In North America, Canada has 30,788 miles and the United States 259,555 miles. In South America the greatest mileage is in Argentina which has 22,310 miles. In Asia the British East Indies head the list with 35,277 miles. In Europe, Germany has 40,381 miles, Russia 36,219 miles, France 31,958 miles, Austria-Hungary 28,704 miles, Great Britain 23,696 miles, and Italy 11,337 miles.

Builders of the West—XCIX

AN examination of the records will show that to the responsibilities and the opportunities to be found on the American farm of half a century ago the vast majority of our American leaders of today credit the foundation of their success. In view of the work which he was later to be called upon to do, it was therefore with excellent judgment that Stephen I. Miller, recently appointed manager of the Northwest Electrical Service League, selected a farm in the state of Michigan on which to be born. His early education, in consequence, was derived partly through the agency of a country school and partly from the ups and downs of farm work in a frontier country. The greatest contribution of this period, according to Mr. Miller, "was learning how to stand up a hand rake properly and to put things in their proper places."

STEPHEN IVAN MILLER

Former Dean of the College of Business Administration at the University of Washington and recently appointed manager of the Northwest Electrical Service League, whose work in practical economics has placed him among the leaders in Western progress.

This putting of things in their places has since become a tradition with the man, and if he may be said to have a philosophy of action it is this very ordering of the components of life, or, as he puts it, "the systematic accumulation of impressions." Books, mountains, deserts and human beings constitute his laboratory, from which his mind emerges in terms of organization and in the spirit of prophecy.

Undoubtedly the loneliness of the farm, located on an unfrequented side road, four miles from the small town high school, had much to do with the development of two traits in his character which were later to play a great part in his life. One was a deep regard for the values of education, and the other a joy in the association with people, especially with youth. The first of these led him from university to university in the acquiring of a foundation in history and economics such as permitted him to build freely and constructively with these elements in his later work, while his interest in human relationships has made him not alone successful as a teacher but a leader of men in any work he has undertaken. It was said that during his experience in the Economics Department of Stanford University, he could hardly do his work for the reason that students hung about him from breakfast time till midnight.

Following his graduation from the little high school at Howell, Michigan, Mr. Miller began his law studies at the University of Michigan, graduating with the class of 1896. He was admitted to the Michigan bar in 1897, but found the law altogether a "wooden occupation" as one of his colleagues put it—and returned to college for a post graduate year in economics, political science, sociology, history and philosophy. Following this, he came West, receiving a literary degree at Stanford with the class of 1898.

From 1898 to 1906 Mr. Miller was a pilgrim in education, studying at the Universities of Heidelberg and Berlin in Germany, the University of California and the University of Michigan. Throughout this period his masters in economics were Schmoller, Rathgen, Adams, Cooley, Taylor, Ross, Plehn and Warner. Of not less importance was his association with the group of other young idealists who were making like pilgrimages to one or the other of these shrines.

In 1903 he began his teaching career as quiz master at the University of Michigan, later teaching at the Universities of Southern California, Stanford and Washington. During this period he received an Austin Scholarship at Harvard University and, while in Cambridge, was a member of the New England Civics Institute. In 1897 he came to the University of Washington where he was made dean of the college of business administration, following the death of his great friend and predecessor, Carl Parker.

Dean Miller's business experience includes three years as field manager for the F. E. Compton Publishing Company from 1904 to 1907. Following this he served two years in the field and legal departments of the U. S. Forest Service.

During the war he served as special examiner for the Federal Trade Commission in addition to his other work. In this connection he made a personal survey of intercorporate relations in the canning industry and analyzed costs in 150 canneries on the Pacific Coast. This is but one of numerous other special investigations for the government, state, city and private interests.

Mr. Miller has recently accepted the position of manager of the Northwest Electric Service League and will turn his enthusiasm into these new channels for forwarding sound relationships in the electrical industry of the great Northwest.

In all his accomplishments he has worked with a rare sense of human values. To Stephen I. Miller, educator and business man, leader of youth and builder of the West in terms of better economic adjustment, this issue of Journal of Electricity and Western Industry is affectionately dedicated.

Letters to the Editor

THE KING TAX BILL

Dear Mr. Sibley:

This is, in a sense, a personal and unofficial letter inspired by the very interesting and enjoyable luncheon of the California Industries Association at the Palace Hotel. I have been very interested in watching and studying the efforts of the various utility corporations to alter the proposed King Tax Bill at Sacramento, and was not entirely surprised to find that their efforts, although in every way justified and put forward with best intentions, were of little effect. I am reminded of an instance of a company doing considerable work in laying conduit for the city of New York, and in order to expedite the contract and improve the work the contractor secured a tamping machine for the back-fill. This machine not only replaced four or five men, but it also did the work considerably better. However, there was considerable criticism of the machine by the city's representatives, and finally the contractor got the head of the department to come and see the machine and watch it work. He explained all its features, etc., which the department head approved, but he said the machine had one fatal deficiency, and when asked what it was, said, "It does not vote." I think that is the fault with most of the good efforts with legislators. All they know are votes, and to attack their program, it seems to me the point to go after is the argument that will appeal to the individual voter and incite him to some form of protest by letter or by other means with his particular legislator. Now in all the advertising done in connection with this bill by the protestors I did not see a single request for any action by individuals, nor did the advertising seem to me to in any way incite a protest from a voter. The arguments were largely in figures far beyond the ordinary individual, and, with the general idea of corporations, any disproportionate increase in their taxation was an advantage to the man on the street. Therefore the weakness of the legislators' program was not along this line.

It seemed to me that the outstanding weakness of their budget, superficially viewed, was the decided increase allowed themselves and their appointees to office in wages for the coming two years. We know that under general conditions at the present time no class of worker is getting increases in wages, but on the contrary large and drastic cuts are being made, and the man on the street knows that; he has felt it and he certainly would not be pleased to know that legislators are increasing their own wages at this time, and at the other man's expense.

The proper protest from this point of view would have a very good effect on the general public, and I believe would bring good results. It is very hard for any of us to see a thing outside of our own environment, and it is very hard for corporation officials to view any action except from the corporation standpoint, so that they only too often miss fire because they take a measure from their point of view instead of that of the general public. I am personally much opposed to the King Tax Bill with its resulting and curtailing effect upon the public utility corporations, and the program of development which they have in view. I should like to assist in some way in making my opposition felt, but in all the action by the protestors I have seen no occasion where any suggestion for action was made. I am merely writing the foregoing as an expression of a few personal ideas that have come to me at this time.

I must congratulate you on the good work you are doing with your paper and will be glad to be of any help that I can be to you in furthering your work.

A READER.

THE SOCIETY FOR ELECTRICAL DEVELOPMENT, INC.

Sir: I appreciate very much the sentiment expressed in your editorial of April 1, 1921, on the work of The Society for Electrical Development, Inc., and I sincerely hope you will feel disposed from time to time to help us in establishing the Society throughout the Pacific Coast. Unfortunately our membership in that section is very weak. Notwithstanding the fact that Californians are up and going, I do not believe the time has yet arrived when they can afford to neglect the opportunity of supporting the work which the Society is doing.

From a strictly selling standpoint, of course the Coast interests are doing an excellent job, but there is still much to be done from a publicity standpoint in reaching a large number of consumers who are still prospects.

Quite aside from all of the above, it is interesting to know that just within the last week, there appeared in the New York newspapers two ads. of Coast power companies offering their securities for sale in the New York market. It is hardly necessary for me to point out to you the fact that the Pacific Coast must now and in the future depend to a large extent on the East to raise the necessary money to carry forward the development work on the Coast.

The very excellent work which the Society is doing throughout the whole country always tends to direct attention to the electrical industry, and unquestionably to aid in attracting new capital to it. This is only one of a series of items I might enumerate as to why the Pacific Coast should not neglect their associates in the East who are doing everything possible toward the upbuilding of the electrical industry in the West. Since you understand this fundamental question so thoroughly, I thought perhaps it might suggest an opportunity for you to point out at an appropriate time the advisability of the Pacific Coast concerns giving us a little help.

WM. L. GOODWIN.

WHERE THE POPULATION CENTERS

Dear Sir: I am in receipt today of your valued Journal of March 15th, and although but a recent subscriber I look forward to the wonderful developments your Journal portrays in the West.

In the issue at hand I note on page 278 a column on "Where the Population Centers." And in the column you note the fact that . . . "there are certain other cities which have closely related metropolitan areas which also have their population figures enhanced to this extent, but it is felt this injustice is slight, and the present listing really presents a more just picture of actual conditions."

In the case of Boston the "Metropolitan Area" is about twice the actual population of Boston as the Census 1920 has it. Within a radius of ten miles of the State House at Boston there are the following cities arranged according to size:

Cambridge	109,694	Medford	39,038
Lynn	99,148	Brookline	37,748
Somerville	93,091	Waltham	30,915
Malden	49,103	Revere	28,823
Quincy	47,876		
Newton	46,054	Total	664,794
Chelsea	43,184	Boston, 1920	748,060
Everett	40,120		
		Metropolitan Boston	1,412,854

In this tabulation no city under 28,000 is listed, although there are several such in the district.

Were the Metropolitan Area of Boston taken into account the Boston district would then approach one and one-half millions, or would be considerably above Detroit in the list of population centers.

There may be other cities in your list whose metropolitan areas would be enough larger to affect their relative positions on the list, but I believe that the case of Boston is one most decidedly influencing her position as a center of population.

ALFRED H. CROSSMAN, Newton Center, Mass.

PERSONALS

A. D. Leach, superintendent of steam heating department, Northwestern Electric Company, and chairman of the Portland Section of the National Electric Light Association, graduated from the University of Oregon, with a B.S. degree in Mining with the class of '06. From 1906 to 1913 he was engaged in civil engineering work of various kinds, especially in railroad location and construction, rivers and harbors work, and municipal engineering and surveying. The next three years were spent on underground construction work, and engineering work in the operating and commercial departments of the Northwestern Electric Company. In 1916 he was made industrial heating engineer, and 1919 superintendent of steam heating, with the same company. Mr. Leach is well qualified to serve as chairman of the Portland Section of the National Electric Light Association, owing to his progressive ideas and his many years of activity in association work in Portland, and he is in part responsible for the big success of the joint meetings held by his association, the American Institute of Electrical Engineers and the Association of Electrical Contractors and Dealers, this season in Portland.

J. C. Plankington, of the Hilo Electric Co., was a recent business visitor in San Francisco.

G. E. Emmons, vice-president of the General Electric Company, was in Portland recently on business in connection with his company.

Paul Lebenbaum, assistant electrical engineer for the Southern Pacific Company, at San Francisco, recently spent a few days in Portland on business.

Gerard Swope, president of the International General Electric Company, and **O. D. Young**, vice-president of the General Electric Company, left for the Orient on the steamer Ecuador.

J. Franklin McNutt has accepted a position with the U. S. Indian Service in connection with gate equipment of the Florence Division Dam. He is at present located in Los Angeles, Cal.

A. G. Clark has resigned as manager of the Associated Industries of Oregon, a position he has held for the past four years, to become associated with the Central Oregon Motor Company of Bend.

D. B. Gauchet, general works manager for the Edison Electric Appliance Co., has recently spent a month at the Ontario plant and has been a business visitor in San Francisco on his return trip to Chicago.

Robert Sibley, editor of Journal of Electricity and Western Industry, leaves April 15 on a trip through the Northwest where he will deliver a series of addresses at Spokane, Seattle and Portland, returning to San Francisco about the first of May.

Robert McF. Doble has been appointed on the staff of The Metals Exploration Company as consulting engineer, with respect to electric and hydroelectric power installations and operations, with headquarters at 201 Fourteenth Street, Denver, Colorado.

Stanly A. Easton, general manager of the Bunker Hill and Sullivan Mining Company of Kellogg, Idaho, is a recent San Francisco visitor. The Bunker Hill and Sullivan mines, it will be recalled, are among the most completely electrically equipped in the world.

Dr. J. A. H. Haaram, chief of construction and bridge building of the government railway department in Netherland, India, is visiting the United States and will be a visitor in San Francisco. Dr. Haaram is studying railway bridge construction in this section of the country.

H. C. McGregor, formerly electrical inspector of the intermountain district for the Board of Fire Underwriters, with headquarters at Salt Lake City, is now with the Pacific Department of the Liverpool and London and Globe Insurance Company, Ltd., with headquarters at San Francisco.

Frederick G. Simpson, electrical engineer, announces the establishment of offices in the L. C. Smith Building, Seattle, where he will be prepared to undertake the design and to supervise the construction of electric plants, machinery and instruments, including lighting, power and communication systems.

W. A. White and **H. T. White** of New York, directors of the Washington Water Power Company, were in Spokane recently in conference with D. L. Huntington, president of the company. They will go to Portland and again spend some time in Spokane on their return. W. A. White is chairman of the finance committee and has been an active figure in the affairs of the company for many years.

Dr. B. M. Rastall, industrial manager for the San Francisco Chamber of Commerce, finds the airplane useful in making a topographical study of the city. Dr. Rastall recently made several flights over the city and along the water front to determine the effect of the contours of the city upon industrial and transportation problems and to develop ideas of the relationship of topography upon the growth of manufacturing and residential districts.

R. A. Lundquist, for three years American Trade Commissioner in South Africa and India, where he has investigated the market for electrical goods, will be in New York from March 25th to 29th, inclusive. While in the city he will make his headquarters at the New York district office of the Bureau of Foreign and Domestic Commerce, Room 734, Custom House, where he will be glad to consult with manufacturers, exporters and others interested in the trade possibilities of South Africa and India.

R. H. Ballard, vice-president and general manager of the Southern California Edison Company, has returned from the East where he has spent several weeks in studying business conditions in that section of the country. While he found business conditions there greatly depressed in many quarters, he is most decided in his views that this depression will never be felt in the West to a greater extent than ten to fifteen per cent of the eastern depression, and that only as a reflex action. Mr. Ballard is very enthusiastic over the forthcoming convention of the National Electric Light Association at Chicago, May 31-June 2, 1921, and in his well known national cooperative spirit is stating that the plans for this convention in a business way will even surpass that of the Pasadena convention of last year, which set such new and helpful records in the electrical life of the nation.

Richard E. Caldwell, of Salt Lake City, has been appointed state engineer of the state of Utah, to succeed **George F. McGonagle,** resigned. The new engineer is a native of Utah, and has been identified with some of the most important engineering projects in the West. Mr. Caldwell was born in Tooele county, Utah, Sept. 27, 1874, and received his education in the public schools of Utah and the University of Utah, graduating from the latter institution after completing an engineering course, in 1904. His principal work has been along the line of civil engineering, the building of power plants, sewers, paving, and drainage systems. He is the senior member of the engineering firm of Caldwell and Richards, and has been in charge of the Millard county drainage project, one of the largest irrigation and drainage enterprises in the West, the purpose of which is to reclaim 80,000 acres of land. Mr. Caldwell's appointment as state engineer will probably result in a more extensive program of reclamation and irrigation development in Utah. Mr. Caldwell is a member of the Utah Society of Engineers. He assumed the duties of his new office on April 1.

A. Hayes Murphy, president of American Wire-Mold Company of Hartford, Connecticut, is a recent San Francisco visitor.

E. A. Epstein, vice-president of the Nitrogen Electric Company of Newark, New Jersey, manufacturers of nitrogen lamps, is a recent San Francisco visitor.

Fred A. Adams, of Spokane, has been named supervisor of the Columbia River survey. Mr. Adams has been serving as the statistician of the survey and is therefore closely identified with the operation of the commission.

Arthur T. Richardson is now representative for the S. K. Lehman Co., of Los Angeles. Mr. Richardson was formerly sales manager for the Wholesale Electric Co. of San Francisco, and will be succeeded by **John F. Davenport.**

Tracy Bibbins, president, and **D. E. Harris,** vice-president and general sales manager of the Pacific States Electric Company with headquarters in San Francisco, are now in the Northwest in order to attend the Merchandising Conference which is to take place in Spokane, Seattle and Portland during the latter days of this month.

Franklin T. Griffith, president, Portland Railway, Light & Power Company; **Guy W. Talbot,** president, Pacific Power & Light Company, Portland, Oregon; and **W. H. Brackenridge,** senior vice-president of the Southern California Edison Company, are in Washington, D. C., attending meetings of the Federal Water Power Commission.

Robert W. A. Brewer, formerly consulting engineer of San Francisco, is now located at Dayton, Ohio, the Engineers' Club. Captain Brewer has just returned from a business trip to England where he presented an interesting paper on the "Practice and Manufacture of Vacuum Tubes in the West," and also one on "Building of Storage Tanks for Fuel Oil."

W. Bartlett Mel, formerly in the valuation department of the Pacific Gas & Electric Company, is now assistant manager of the Panwela Pineapple Company at Haiku, Maui, in the Hawaiian Islands. Mr. Mel has recently made a very interesting trip to the great volcano on the island of Hawaii, where he was greatly impressed with the engineering possibilities of harnessing such a gigantic force of nature as there presented.

R. F. Monges, formerly engineer for the General Electric Company at Portland, has been transferred to the San Francisco office of the company.

A. A. King has accepted a position as chief electrician with the Phelps-Dodge Corporation, Copper Queen Branch, Mines Department, Bisbee, Ariz.

Frederick A. Kolster has left the Bureau of Standards, Washington, D. C., to accept a position with the Federal Telegraph Company, Palo Alto, Cal.

Jan F. Kottland, a civil engineer of the Consulate of Czecho Slovak Republic, is making an intensive survey of the railway electrification and development of hydroelectric resources of the West. For the present he has his headquarters in San Francisco.

George K. Whitworth has severed his connection with the Bethlehem Shipbuilding Corporation of San Francisco, and does not expect to be identified with any firm for the next two years, as he will give his entire time to further studies in engineering. His address is 2415 Bowditch Street, Berkeley, Cal.

M. Darrieus and **M. Lestrade,** engineer and manager of the Electro Mechanique, and **M. Parodi,** chief engineer of the Paris Orleans Railway, members of the French Railway Commission which is investigating the electrification of railways in the United States, are recent visitors in San Francisco, arriving from Seattle where they have investigated the electrification of the Chicago, Milwaukee & St. Paul and the Great Northern railroads.

E. C. Hutchinson, chief engineer, Pelton Water Wheel Company, has returned from a six weeks' visit to the Hawaiian Islands. Mr. Hutchinson, it will be recalled, was formerly president of the San Francisco Engineers' Club and has been prominent in engineering matters in this vicinity. He comes back with many interesting observations on the Hawaiian Islands and their possibilities. He is rather silent, however, in discoursing about Waikiki Beach.

W. D. B. Dodson, general manager of the Portland Chamber of Commerce, has returned from Washington, D. C., where he spent the past two months looking after matters before the United States Shipping Board and Congress, which affect Portland. He reports optimism throughout the East on the part of big financial interests but looks for little to be done for several months. The East has its eyes on the Pacific Northwest, and as soon as conditions become more stable, he looks for many industries to be established here.

Sylvester L. Weaver is the new president of the Los Angeles Chamber of Commerce, the largest civic organization in the world. His first official act was to head the expedition to the cities of western Mexico which was made to establish friendly relations with our southern neighbors. The party left Los Angeles by special train of Feb. 8th and returned on the 19th. Mr. Weaver has lived in Los Angeles for the past twenty years and from the beginning has been active in all movements for the advancement of his town. For many years he has been a wheel horse in the Chamber of Commerce, having served successively as director, second vice-president, first vice-president, and now as head of the organization. He is a member of all the important clubs and is a vice-president of the National Park Highway Association. He is a strong advocate of California's program for hydroelectric development and laid great stress on this subject in his inaugural address.

Business Activities in Western Market Centers

GENERAL

Among the outstanding events that have affected industrial conditions in the West during the past few weeks have been the closing of the copper mines in Montana, Utah and Arizona. Previous to the complete cessation of mining operations copper production has been at from 40 to 50 per cent of normal and there has been a feeling that the consumption of the red metal would increase somewhat in the early spring; this did not materialize. The flotation of the $40,000,000 bond issue with the four hundred million pounds of copper held by the various producers as security was for the purpose of gaining credit on better terms than could be furnished by the banks, and of course would not make possible increased production. There is a general feeling that the resumption of mining operations must wait upon the development of an export demand for copper. There has been an increase of unemployment as a result of the closing of the mines but the maintenance of the properties in condition to resume operations calls for a considerable number of men; in the Butte district a canvas made by the Butte Miner indicates that the pay roll will call for about 3000. In order to relieve conditions as much as possible the Anaconda Copper Mining Company is operating a free employment agency. Reports from Butte, Salt Lake City and Arizona seem to indicate that conditions will not be as serious as at first anticipated.

In the Northwest there has been a resumption of lumbering operations, partly as the result of reductions in freight rates to Eastern points, and partly as the consequence of a resumption of building operations. In the larger cities of the Northwest there have been wage reductions in the building trades amounting to about twenty per cent. In the San Francisco Bay district and in Los Angeles there is considerable building activity.

SAN FRANCISCO

Activity in the real estate market is the outstanding feature of the past few weeks in San Francisco Bay district, and this indicates a revival of building activities which has already been felt in the demand for residence construction. The total building operations recorded for March amounted to $2,759,118, divided about equally between frame and brick and concrete construction. Demand for office space in preferred locations continues and leases have been effected for practically all the space in the new Alexander and California-Commercial buildings. Collections continue "slow," and certain lines of trade report business as "very poor"; however, spring buying is considered good by the large department stores, considering the general tendency to wait for lower prices. On the whole retail buying continues to be cautious. There is still considerable unemployment, and although there have been some wage reductions, labor on the whole does not take kindly to suggestions that wage reductions will revive business and ultimately work to its advantage.

LOS ANGELES

Los Angeles building permits for March were over $6,000,000, indicating a continuation of the activity in these lines; by furnishing employment for a large number of people it has had the effect of sustaining business in stable lines in addition to the building trade. It is not surprising, therefore, to find business in general reported as "good." Collections are not as sure as for some months past, due to the usual spring demand for taxes, including income, property and personal taxes; collections are reported as fair. The automobile trade is still in an unsatisfactory condition with no sign of immediate improvement. The motion picture producers are on a hand-to-mouth basis, reflecting the curtailment in spending throughout the country. In the rural district business is good with the exception of the citrus belt where higher freight rates and the importation of lemons from abroad has had serious effect. It is the consensus of opinion that a tariff is urgently needed if the citrus fruit growing industry in Southern California is to continue prosperous.

SALT LAKE CITY

Throughout the intermountain country, particularly in Salt Lake City and in the Butte district, the closing down of the copper mines has resulted in a considerable increase in unemployment and as a result has affected some of the other industries adversely. In Salt Lake City this has brought about a slump in those businesses furnishing the copper producers with mine and mill supplies. In the electrical trade it has been necessary to carry out intensive selling campaigns in order to move goods, the same condition existing in the hardware and dry goods lines. Improvement is expected with the coming of spring weather. In some districts the farmers are liquidating products held since the last harvest and are getting on a better financial footing, with the result that business throughout the farming districts has improved. Banks report conditions as fairly good with a steady demand for money. Retail merchants in various lines report business as fairly good and in some instances better than this time last year. Collections are "fair."

PORTLAND

Unemployment, which has been somewhat acute, has been relieved by a resumption of building and the opening up of work upon the farms. Road construction has also given employment to a considerable number of men. Permits for residence construction are fifty per cent greater than for March of last year and electrical contracting shows marked signs of improvement both in wiring and in fixtures. Dealers report business poor but the outlook for increased consumption is hopeful. Retail trade in other lines is fair and collections good. Grain prices have declined and there is a disposition to deliver some of the holdings at the lower prices; buying has been largely for export. Food prices continue to decline with the exception of flour and dairy products.

SEATTLE

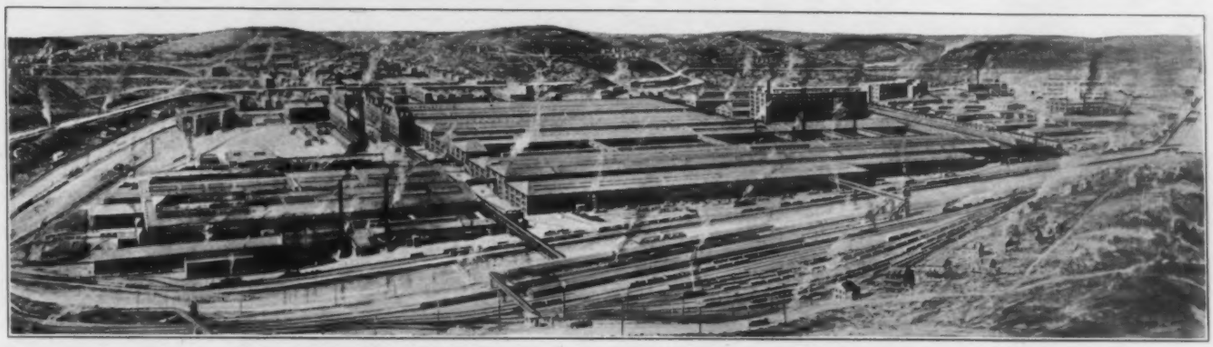
Through the Northwest there have been wage reductions in many lines of business; in an effort to stimulate building activities there have been wage cuts of approximately 20 per cent put into effect by the master builders' associations in Seattle and Everett. A similar cut will be put in effect by the Tacoma association May 1. While it is too soon to determine results from these reductions, the building trades are more than optimistic. The reductions in freight rates on lumber have resulted in considerable increase in lumbering operations, and although this reduction is not considered sufficient to put the Northwest on an equal footing with the South, its effect has been stimulating. Wholesale trade is characterized as "slow" and retail trade is quiet, as in other sections of the country there is a tendency to wait for further price reductions. Collections are fair and no considerable amount of new credit is being extended. Unemployment through the Northwest is less serious than for some time past and this condition is expected to continue to improve.

BUTTE

With the suspension of mining operations in Butte by the Anaconda Copper Mining Company a most serious situation is presented to the whole community, including Anaconda and Great Falls, although the heaviest part of the burden must fall upon the underground workers in the mines at Butte who have families dependent upon them. There seems to be no definite assurance as to the possibilities of an early resumption of operations; in fact, the situation is dependent upon the consumption of the large amount of surplus copper now on the market, as well as when the price of the metal will reach a point where resumption of operations will be justified. There are about 3,000 still employed in and around the mines at Butte, and in the other sections of the state affected by the closing of the mines there are a considerable number of men employed as watchmen and in other positions.

There is in and around Butte a considerable number of non-mining industries, and while these are in a way dependent upon the mining industry to realize full scale operation, there is sufficient demand for their produce under present conditions to keep up production. On the whole the situation is not taken as seriously as might be expected and there is a feeling that there will be a period of uninterrupted prosperity with the resumption of operations.

HAPPENINGS IN INDUSTRY



General view of East Pittsburgh Works of We stinghouse Electric & Manufacturing Company

NEW INDUSTRY ENTERS THE WEST

The Westinghouse Electric & Manufacturing Company, one of the largest manufacturers of electrical machinery in the world, has recently purchased at Emeryville, California, a twelve-acre tract of ground adjoining the Southern Pacific Railroad, upon which it expects shortly to erect buildings that will give increased advantages and space to its San Francisco service shop and warehouse. This will be followed by the erection of additional buildings to provide facilities for assembling electrical machinery for use on the Coast. This plant will undoubtedly be ultimately used for building and testing electrical machinery and will prevent delays in shipments and contribute to better service for Coast cities.

H. P. Davis, vice-president in charge of operations, Westinghouse Electric & Manufacturing Company.

Plans for the first group of buildings, comprising an approximate floor space of 120,000 sq. ft., are now being prepared by the company's architects at East Pittsburgh, Pa. From present indications the first building erected will be patterned after the new plant recently built at Mansfield, Ohio.

This important move is the outcome of a visit during the latter part of 1920 to the Pacific Coast by two of its officials, H. P. Davis, vice-president, in charge of operations, and W. K. Dunlap, acting vice-president.

K. E. Van Kuran, Los Angeles district manager, Westinghouse Electric & Manufacturing Company.

This visit comprised a trip up and down the coast for the purpose of reviewing conditions with the different local representatives, including W. H. Whiteside, general representative, K. E. Van Kuran, manager, Los Angeles district, C. E. Heise, manager, San Francisco district, and W. D. McDonald, manager, Seattle district.

These officials were tremendously impressed with the activities on the Pacific Coast and the wonderful promise for electrical and industrial development in the future. They expressed themselves as being convinced of the necessity of broadening and improving the company's facilities on the Pacific Coast. At the present time the Westinghouse company maintains sales offices, warehouses and thoroughly up-to-date service and repair shops in Los Angeles, San Francisco and Seattle. Through the service shops it has been able to serve its customers in making repairs and giving quick service in cases of break-downs. The superintendents of these shops are men of long experience with the Westinghouse company and are thoroughly acquainted with its apparatus and policies.

The service thus rendered has been invaluable and it is the company's desire to extend it. Feeling that the future demands will be largely increased because of the splendid growth of the electrical business on the Pacific Coast, it has planned to provide permanent locations so that this growth may be properly cared for.

C. E. Heise, San Francisco district manager, Westinghouse Electric & Manufacturing Company.

The Westinghouse Electric & Manufacturing Company has its main plant at East Pittsburgh and has plants in many other cities. Among these are South Philadelphia, Pa., Newark, N. J., East Springfield, Mass., Cleveland and Mansfield, Ohio.

Respecting its Western representatives, it has been the policy of the Westinghouse company to employ men who are natives of the Pacific Coast. Mr. C. E. Heise, manager of the San Francisco district, was born in San Francisco and received his early education in the public schools of that city. He was graduated from the University of California in 1898 and entered the employ of the Westinghouse company the same year as construction engineer. In 1912 he received the appointment of manager of the San Francisco district.

W. D. McDonald, Seattle district manager, Westinghouse Electric & Manufacturing Company.

Mr. Heise personally handled the actual purchase of the Emeryville property and is taking full charge of the company's new development program.

EXAMINATION FOR REGISTRATION OF OREGON ENGINEERS

The next examination for registration of professional engineers in the state of Oregon will be held by the state board of engineering examiners on Friday, May 6, 1921, at 520 Corbett Building, Portland, Ore. Applications for the same may be obtained from A. B. Carter, secretary of the board, 520 Corbett Building. Applications should be in the hands of the board 30 days before the date of examination.

AN INTERESTING ACCIDENT

In a recent electric storm the 60-kv. line of the Western States Gas & Electric Co. was struck by lightning. The illustration shows one of seventeen poles that were shattered; fourteen of these had to be replaced in making repairs. The remarkable feature of this particular case is the fact that though the force of the lightning was sufficient to throw all of the generators off the line, upon testing the line it tested "clear" and the line was operated until the trouble man reported the damage to the company.

AMERICAN WIRELESS STATION AT SHANGHAI TO BE LARGEST IN THE WORLD

Under an agreement with the Government of China the Federal Telegraph Co., of Palo Alto, California, will very shortly commence the erection of a wireless telegraph station at Shanghai larger than any now in existence.

While the kilowatt capacity of the station is the same as that at Bordeaux, France, this new station will have six masts, each a thousand feet high, whereas those at Bordeaux are only 826 feet in height. The station is to be completed within 18 months and will have sufficient capacity to transmit and receive messages across the Pacific without the necessity of relay. The company will also erect other stations at Peking, Harbin, and Canton, which, together with the Shanghai station, will give China unequaled wireless facilities.

APPLICATION OF UTAH COPPER CO. FOR REHEARING DENIED IN UTAH RATE CASE

The Public Utilities Commission of Utah has denied the application of the Utah Copper Company for rehearing of the case in which the Utah Power & Light Company was given permission to increase its power rates.

In denying the application the commission stated in effect that after considering all allegations and reasons offered as grounds for rehearing of the case, it failed to find sufficient cause.

The Copper company charged that the rate fixed by the commission in a previous order was unlawful, unjust, illegal and unwarranted as being unconstitutional. They attacked the constitutionality of the order on the grounds that it denied them property without due process of law, and denied them the equal protection of the law.

NEWHALEM CREEK PLANT BEING RUSHED TO COMPLETION

Completion of the Newhalem Creek power plant by June 15 will put into operation the first unit of the Skagit power project, according to a statement of the engineer in charge, C. F. Uhden. The plant will develop 3,000 hp. through use of a 2,700-foot tunnel and a 900-foot steel pipe line from a dam three-fourths of a mile up the creek. Work on the rock tunnel has been rushed during the winter, and the railroad from Rockport to Newhalem is nearing completion. While the Newhalem unit will begin generating power June 15, according to present plans, it will not furnish electricity to Seattle for the light department, but for the present the power will be used in the work on Gorge Creek, the next step in the Skagit development, and the first to produce power in large quantity. After completion of the work, the power will be delivered to Seattle.

FEDERAL WATER POWER REGULATIONS REOPENED

The Water Power Committee of the National Electric Light Association and representatives of water power companies appearing before the new Federal Water Power Commission in Washington, D. C., on March 25, suggested a number of changes to the rules and regulations promulgated by the previous commission on March 4. Some of these rules, it was claimed, are of a nature to discourage, if not altogether retard development because of inability to finance properly under them.

In the group shown on the steps of the State, War and Navy Building in Washington, reading right to left are: Front row—Thomas W. Martin, president, Alabama Power Company, Birmingham, Ala.; Henry J. Pierce, Washington Irrigation and Development Co., Seattle, Wash.; O. C. Merrill, secretary, Federal Power Commission; Franklin T. Griffith, president, Portland (Ore.) Railway, Light & Power Company and chairman of the N. E. L. A. Water Power Committee; W. A. Brackenridge, vice-president, Southern California Edison Company, Los Angeles, Cal.; Guy W. Talbot, president, Pacific Power & Light Company, Portland, Ore. Second row—O. G. Thurlow, chief engineer, Alabama Power Company, Birmingham, Ala.; R. H. Ballard, vice-president and general manager, Southern California Edison Company, Los Angeles, Cal.; Harrison B. Freeman, Connecticut River Company, Hartford, Conn.; W. H. Onken, Jr., editor of the Electrical World; Hugh L. Cooper, consulting engineer, New York City; Paul Wooton, Washington, D. C. Third row—Dr. George L. Hoxie, consulting engineer, Los Angeles, Cal.; C. M. Clarke, president, Tennessee Railway, Light & Power Company, Chattanooga, Tenn., and member of the firm of E. W. Clark & Company, bankers, Philadelphia, Pa.; Senator J. Newcomb, New York; Fred W. Herbert, National Electric Light Association, and W. V. King, chief accountant, Federal Power Commission.

The Water Power Commission of the National Electric Light Association on the steps of the War and Navy Building, Washington, D. C.

FRUIT AND VEGETABLE DEHYDRATORS ORGANIZE

J. B. Howell, of San Francisco, was named temporary chairman of the league and a committee was chosen to prepare a constitution which will be reported for approval at a general organization meeting March 28th.

SEATTLE TO STIMULATE BUILDING ACTIVITIES

Various real estate concerns, building material dealers, architects, contractors, and banking interests, in an effort to stimulate lagging building activities in Seattle, have embarked upon an advertising campaign showing that building costs have fallen 28 per cent since 1920. In a full page in a Seattle daily paper, recently, they used as an example a five-room home, which in 1920 cost $5,789.48 and which now would cost but $4,170.67. According to claims made, there is a 20% decrease in excavation and grading, 10% in plastering, 20% in plumbing, 20% in lighting fixtures, 20% in hardware, 48% in lumber, 33 1/3% in millwork and glass, 20% in carpenter work and 10% reduction in builders' fees. Summed up, it is claimed that $1,619.81 can be saved over 1920 on the house referred to.

CANNING AND PRESERVING COMPANIES OF WASHINGTON AND OREGON PLAN CONSOLIDATION

The Oregon-Washington Canning & Preserving Company, with which is identified groups of fruit packers, fruit growers and financiers, was recently organized, to operate and control the larger part of the fruit growing, canning and preserving business of the states of Washington and Oregon. The company is capitalized at $100,000,000 and will, as soon as details of organization are completed, take over and operate about a dozen fruit canning and preserving plants in the two states. Headquarters of the concern will be maintained in Seattle, Portland and Tacoma. W. H. Paulhamus of Puyallup, president of the Puyallup & Sumner Fruit Growers' Association, took active part in promoting the merger. A few of the important men who are identified with the movement are H. C. Henry, of the Henry Investment Co., Seattle; J. W. Spangler, president, Seattle National Bank; Reginald H. Parsons, president of Northwestern Fruit Exchange; W. L. Rhodes, Rhodes Bros., Seattle; Chester Thorne, chairman of Board of Directors, National Bank of Tacoma; W. R. Rust, capitalist, Tacoma; C. C. Colt, vice-president of First National Bank of Portland; S. L. Eddy, vice-president of the Ladd & Tilton Bank of Portland, and Frank E. Spencer, of Allen & Lewis, jobbers, Portland.

INTERESTING DECISION OF THE PUBLIC UTILITIES COMMISSION OF UTAH

A piece of hatpin inserted in a meter used to measure the electric current supplied to the G. B. Morrison Pie Company of Salt Lake City brought about a hearing and a formal report by the Public Utilities Commission of Utah, the report finding that the pie company must install a metal switch box to inclose the meters and a metal conduit to enclose the wires leading to the meters.

The fragment of the hatpin was found December 3 last in the light meter of the pie company. In the previous April a similar fragment had been found in the fuel meter of the company, and led to a warning from the Utah Power & Light Company that a repetition of such a find would lead to a discontinuance of service. When the repetition occurred, as testified to by the power company's inspector, the power company gave the company the alternative of installing a meter protective device or doing without the service. The pie company protested to the Public Utilities Commission, where G. B. Morrison testified that he was in no way responsible for the presence of the wire. He did not explain how it got there, and the commission thought this failure and the undisputed presence of the wire sufficient ground for sustaining the stand taken by the power company.

OGDEN VOTES AGAINST MUNICIPAL PLANT

Municipal ownership of an electric power plant was defeated in the bond election held at Ogden, Utah, March 26. The bonds voted on were in the total sum of $2,025,000, which included various proposed improvements such as storm sewers, bridges, paving, sidewalks, curbing, sanitary sewers, waterworks, parks, fire apparatus, and also $500,000 for a municipal power plant. The power plant, parks and fire apparatus were defeated, amounting to $595,000, while the balance of the bonds carried.

Interest centered in the vote on the power plant, and this issue was hotly contested throughout the campaign. Mayor Frank R. Francis was the chief proponent of the power plant, and had the support of the labor organizations; while on the other hand the Chamber of Commerce conducted an active campaign against the power plant bonds, and was supported by various other business men's organizations.

The vote was rather close on some of the issues, particularly on the power plant.

JUNIORS VISIT THE PUBLISHING HOUSE OF McGRAW-HILL COMPANY OF CALIFORNIA

Getting the Method Electrical Over to the Younger Generation Proves an Interesting and Instructive Afternoon to a Number of the Younger Generation in and about the San Francisco Bay Region on Thursday afternoon, March 24, 1921.

The Mc-Graw-Hill Company of California, publishers of Journal of Electricity and Western Industry, while by no means possessing the extensive equipment installed in the New York headquarters, has, however, the latest model in everything pertaining to the printing art that has thus far been evolved in the method electrical. The new Intertype machine, electrically operated throughout, proved an unusual attraction on the occasion of a visit to the plant of the following: (1) Charles J. Derleth, (2) Arthur Bowman, (3) Elwood Woolsey, (4) John Coolidge, (5) Richard Willetts, (6) Bruce Younger, (7) Robert Sibley, (8) Cecil Burrill, (9) Catharine Sibley, (10) Charles Stoppani, (11) Ralph Phelps, (12) John Howell.

CITY OF TACOMA TO SELL ELECTRIC POWER OUTSIDE CITY LIMITS

In spite of the fact that the bill which would have specifically given the city of Tacoma the right to sell electric power outside the city was killed by the recent legislature, Commissioner Ira S. Davisson of the light department is going to proceed with contracts for the sale of power outside the city limits. The city light department has informed Torger Peterson, who, with other residents of the Ohio Valley, has organized a small distributing company for the purpose of supplying light and power to that valley, that the city will sell the company power and allow it to string its wires on the towers of the city's transmission line until such time as this may interfere with the Company's wires. Commissioner Davisson asserts further that he intends to supply the Port Com-

mission, which has applied for current for use on its docks on the tide flats, beyond the city limits.

Commissioner Davisson is of the opinion, backed by competent legal authority, that the laws as they stood before the last legislature would permit a city to sell surplus current outside its limits. The effect of the bill passed by the recent legislature, making it necessary for private corporations to apply to the state director of public utilities for permission to enter any territory where another company is now operating, if anything, strengthens this claim, he believes.

"I do not believe that any court will bar a city from selling surplus current to a community, because electricity is recognized now as such a modern necessity that to deny anyone its advantages would be unbearable," Commissioner Davisson stated. "There is no specific denial of the right to cities in the laws, and it is merely a matter of there being no specific grant of right."

It is not known whether the action of the Tacoma light department will be challenged by the private corporation interests or not. Heretofore, the city has not been challenged, although it has sold current to Eatonville, Steilacoom and other points outside the city limits.

PAPER PULP PRODUCED IN ALASKA

Samples of the first pulp produced by the Speel River and the Alaska Pulp and Paper Company have recently been received in San Francisco. This is a development that will be watched with interest by those who are familiar with the newsprint industry on the Coast. The mill is entirely operated by electricity and is the first of its kind in Alaska; the capacity is 20 tons per day. Power is available for a considerable increase in production and the raw materials are available in unlimited quantity.

CONTRACT LET FOR DAM ON CHELAN RIVER

A contract has been let by the Chelan Falls Power Company for construction of a 30-foot dam across the Chelan river at its narrowest point for $40,000. The dam is to be of concrete and will increase the available electrical energy many fold. The power company is owned by George D. Brown, formerly manager of the Wenatchee Valley Gas & Electric Company, but an option to purchase the entire plant was given to the Chelan Electric Company, a subsidiary of the Great Northern, in 1918, when the first unit was built. It is believed that a much larger unit will be built when the dam is completed. The first unit develops 1250 horsepower.

Trade Notes

Cutter Company of Philadelphia Establishes Factory Representative at San Francisco —

C. F. Henderson, Call Building, San Francisco, has been appointed factory representative for central and northern California and Nevada for the Cutter Company of Philadelphia, manufacturers of I-T-E circuit breakers and U-RE-LITE switches.

Davidson-Atwood Electric Co. Moves Into New Quarters —

The Davidson-Atwood Electric Company of Portland has moved from 390 Morrison Street to 359 Ankeny Street, where they have established a store and shop.

New Firm of Consulting Engineers for Salt Lake City —

George F. McGonable, retiring state engineer of Utah, and C. J. Ullrich, his former deputy, have formed a partnership to engage in the general business of consulting engineering in Salt Lake City, under the firm name of McGonagle & Ullrich, with offices in the Deseret Bank Building.

New Envelope Manufacturing Company for Seattle —

The Northwest Envelope Mfg. Co., Empire Building, is making plans to immediately erect, equip and operate an envelope manufacturing plant in Seattle. The proposed plant will have a daily capacity of 300,000 envelopes, and will cost $50,000.

Hurley-Mason Company Closes Seattle Office —

The Seattle offices of the Hurley-Mason Company, general contractors, which have been maintained in the Lowman Building for years, will be closed immediately and consolidated with the Tacoma and Portland offices.

W. S. Turner Forms New Organization in Portland —

W. S. Turner, who has been a consulting electrical engineer in Portland for the past ten years, has formed an organization to act as manufacturers' agents for the sale of equipment for electric railways, lighting and power systems, pumping and industrial plants; to make investigations, reports and appraisals; and to design and construct public utilities, municipal and manufacturing works.

Winton Engines and Westinghouse Motors to Be Used on Golden Gate Ferry Co.'s Boats —

Frank G. Bryant, California representative of the Winton Engine Works, has just returned from Cleveland and Pittsburg where he conferred with Alexander Winton and Westinghouse Electric & Manufacturing Company officials regarding the large oil engine electric drive contract which was recently secured from the Golden Gate Ferry Company of San Francisco.

Electric Motor Insurance Policy —

The Behrendt-Levy Co., Inc., of Los Angeles, has recently announced a new type of insurance policy, issued by the Royal Indemnity Company, which provides for four inspections of electric motors per annum. These inspections are thorough and include complete tests of the efficiency of the motors by an expert. Should a motor burn out in use the company will repair the motor and provide a spare while repairs are being made.

Springfield Water-Tube Boiler Co. Opens Western Office —

A. L. Harris, formerly of the commercial department of the Pacific Gas & Electric Company, is now Pacific Coast representative for the Springfield Water-Tube Boiler Co., with offices at 22 Battery Street, San Francisco. This type of boiler was recently installed by the United Electric Co., of New York, in the new 22,000-hp. Hudson Station.

A General Utility Insulating Varnish —

A black insulating varnish characterized as "General Utility Inco Insulite No. 16" has recently been placed on the market by the International Paint Corporation of St. Louis. The purpose of this varnish, as its name implies, is to furnish an "all around" product that will efficiently care for a majority of all the insulating varnish requirements of manufacturers of electrical equipment and apparatus, and for repair and re-building shops.

General Electric Convention to be Held in Portland —

A merchandising convention will be held in Portland April 22 and 23, for jobbers, dealers, central station operatives and others interested in the latest type of electrical appliances. The convention will be conducted by the General Electric Company, and the Pacific States Electric Company is making the special arrangements.

Electrical Alloy Co. Issues Attractive Calendar —

Showing San Francisco, "which arose from its ashes almost in a night," the Electrical Alloy Co. of Morristown, N. J., presents its message in a manner attractive to the Western users of its products; resistance wires and alloys which cover the field for these materials.

MEETINGS OF INTEREST TO WESTERN MEN

(The importance of Oregon in the mining field is reflected in the formation of a local section of the A. I. M. M. E. at Portland. Utah engineers form an engineering council. N. E. L. A. Convention at Chicago will be one of the most important yet held.—The Editor.)

A. I. M. M. E. Forms Oregon Section

The Oregon Section of the American Institute of Mining and Metallurgical Engineers was organized at the International Mining Convention, held in Portland, April 5-9. Both President Ludlow and Secretary Stoughton of the home office of the society at New York were present at the installation ceremony and dinner. There are about 35 mining and metallurgical engineers in Oregon who are eligible for membership in the new section.

Oregon Association of Electrical Contractors and Dealers Hold Meeting

A joint meeting of the first and third districts of the Oregon Association of Electrical Contractors and Dealers was held at Albany, March 15, at which all branches of the industry were well represented. In addition to routine business, Mr. Hodge, of the Chicago office of the Mountain States Power Company, spoke on cooperation between central stations and the contractor-dealer. A. C. McMicken, of the Portland Railway Light & Power Company, spoke on the work of the Northwest Electric Service League, and the work of the Contractor-Dealer Association. The next regular meeting of the third district will be held in Corvallis.

Oregon Contractor-Dealers Plan Convention

Eugene, Oregon, is considered as a possible location for the annual convention of the Oregon Association of Electrical Contractors and Dealers, to be held early in June. Plans for the convention are well under way.

N. E. L. A. Convention, Chicago, to be Great Success

There is to be a powerful convention at Chicago May 31-June 2, 1921, of the National Electric Light Association. It is reported that even the business discussions that proved so helpful at Pasadena last year will be eclipsed at the Chicago affair.

Vice-President Coolidge and Secretary Hoover will both be in attendance and give addresses. There is to be an awakening throughout the nation as the result of this great convention in the sensing of the present-day status of business conditions that is sure to follow, and men of the West will do well to plan attendance in every instance where leave from activities in the West is possible.

Illuminating Engineering Society Discusses the Testing of Automobile Headlight Lens

Prof. B. F. Raber of the mechanical engineering department of the University of California presented a very interesting and instructive paper at the regular meeting of the San Francisco Bay cities chapter of the Illuminating Engineering Society, upon the subject of "Automobile Headlight Testing," and this was followed by a practical demonstration of headlight lens testing and discussion.

Oregon Technical Council Active

The Oregon Technical Council, which is comprised of representatives of all the engineering societies in Portland, has a very efficient organization and has been doing some good work in legislative and civic matters, and matters affecting the welfare of engineers. At the present time they are organizing a committee to make a study of a super-power project for the Northwest, at the request of the Portland Chamber of Commerce. The city attorney's office has asked the council to make recommendations for consulting engineers to appear before the commission on behalf of the city at the rehearing of the telephone rate case now before the Public Service Commission of Oregon. In accordance with a request from the state labor commission, the council has appointed two men to serve on an examining board for the selection of boiler inspectors to enforce the recent boiler code adopted by the State Industrial Accident Commission.

Portland Electrical Societies Meet

The regular monthly joint meeting of the Portland Sections of the A. I. E. E., N. E. L. A., and the Oregon Association of Electrical Contractors and Dealers, was held at the University Club, March 22. Mr. John E. Gratke, the speaker of the evening, told of the plans for the Atlantic-Pacific Highways and Electrical Exposition. He made all his hearers better appreciate the scenic wonders of the Northwest, and aroused considerable enthusiasm in the exposition. Mr. Gratke's talk was followed by a practical demonstration of wireless telegraphy and telephony, by Charles Austin, radio expert. The meeting was attended by 103.

Engineers of Utah Organize Council

An engineering council of Utah, including representatives from all branches of the engineering profession—civil, mining, electrical and mechanical—has just been organized with headquarters at Salt Lake City.

The purposes of this organization are united consideration of and action on matters of common concern to engineers, as well as matters of public welfare embodying the application of engineering knowledge and practice; the maintenance of a high professional standard among engineers, and the correlation of the local activities of engineering societies.

The engineering council of Utah will be directed by a governing board consisting of two representatives from each of the member societies. The governing board, as represented at the first meeting of the engineering council, included the following men:

American Society of Civil Engineers—R. K. Brown and Theo. A. Beyer.
American Institute of Electrical Engineers—Dr. Joseph F. Merrill, Paul P. Ashworth.
Utah Society of Engineers—Hylom T. Plumb, A. C. Watts.
American Institute of Mining Engineers, Henry M. Adkinson, Edward R. Zalinski.
American Association of Engineers—Charles J. Ullrich, Charles S. Fisher.
American Society of Mechanical Engineers—Louis J. Seckles and L. Douglas Anderson.

Temporary organization was effected by the election of Hylom T. Plumb as chairman and Theodore A. Beyer as secretary. Plans were laid for a general ratification meeting to be held in the form of a banquet to all engineers of the state at an early date. At these meetings technical papers and discussions of important public questions involving engineering principles will form the greater part of the program.

COMING EVENTS

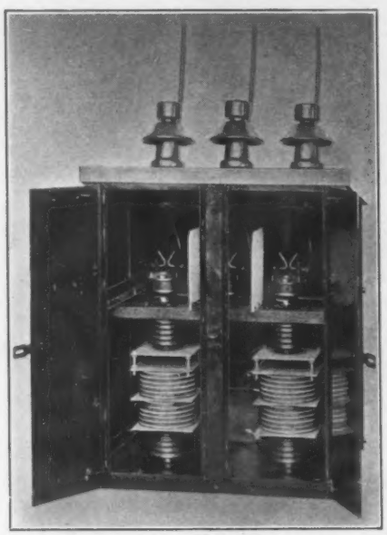
PACIFIC COAST SECTION, NATIONAL ELECTRIC LIGHT ASSOCIATION
Annual Convention—Del Monte, California, June 7-10, 1921
AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS
Annual Convention—Salt Lake City, Utah, June 20-26, 1921
NATIONAL ELECTRIC LIGHT ASSOCIATION
Annual Convention—Chicago, Ill., May 31-June 2, 1921
AMERICAN SOCIETY OF MECHANICAL ENGINEERS
Spring Meeting—Chicago, Illinois, May 23-26, 1921
CALIFORNIA STATE ASSOCIATION OF ELECTRICAL CONTRACTORS AND DEALERS
Annual Convention—Santa Cruz, June 16-18, 1921
SOUTHWESTERN ELECTRICAL & GAS ASSOCIATION
Annual Convention—Galveston, Texas, May 18-21, 1921

LATEST IN APPLIANCES AND EQUIPMENT

(The third edition of the National Electric Safety Code has been issued by the Bureau of Standards. The General Electric Company has developed a new type of out-door film lightning arrester. Ohio Brass Company has a new arc welding machine.—The Editor.)

OUT-DOOR TYPE OF OXIDE FILM LIGHTNING ARRESTER

A type of oxide film lightning arrester suitable for out-door use to furnish protection on lines where the voltage ranges between 1000 and 7500 volts has recently been developed by the General Electric Company. It is especially adapted to protecting isolated low voltage transformer installations of comparatively large capacity, or low voltage generating plants and substations where lack of attendance, or space made the other types of arresters impractical.



Enclosed units of this oxide film lightning arrester allow of installation in out-of-the-way places or out of-doors.

The new oxide film arrester consists of a stack of oxide cells totally enclosed in a steel case. The spark gaps are also enclosed in this case, which allows the same gap settings for outdoors as would be used indoors, which insures high sensitiveness. The arresters are made for platform mounting, the size and weights being such that the installation is a fairly simple matter. They require no attention outside of inspection after lightning storms, and a semi-annual testing to see that they are in good shape.

NEW CUTLER-HAMMER WIRING SPECIALTY

A small cord connector, Catalog No. 7850, which is shown in the small illustration below, has been designed by the Specialty and Switch Department of The Cutler-Hammer Mfg. Co. of Milwaukee, Wis., for use with drink mixers, portable electric heaters, washing and ironing machines, hair clippers, and other electric appliances, which demand a neat cord connector of small size and adequate capacity. It has the National Electrical Code rating of 10 amperes, 250 volts.

The small size and knurled finish of this C H cord connector give it an attractive appearance.

NEW ARC WELDING MACHINE

A new arc welding machine, especially intended for rail bonding and track work, has been brought out by the Wilson Welder & Metals Company. The machine was designed at the request of The Ohio Brass Company which acts as sole selling agent.

Fundamental in the Wilson Plastic Arc Rail Bond Welder is uniform heat per unit area in the weld. This is accomplished by means of a short arc and automatically controlled current, which is accomplished by a solenoid operating in conjunction with a carbon pile. During welding, the regulator automatically maintains the current at a practically constant value regardless of line variations. Short circuit current is held to about 10% of welding current. Heat is controlled within 4%.

Although the machine is specifically designed for rail bonding and track work it is also valuable for general repair and shop welding, as it has been designed for continuous service at full rated welding current.

NEW FEED THROUGH SWITCH

One of the distinguishing features of the new Feed Thru Switch recently placed on the market by the Beaver Machine & Tool Company, Inc., of Newark, N. J., is its shape. It is designed to harmonize more closely with the wire connected through it, both in size and contour. Its lines are long and narrow, presenting a graceful and artistic effect when connected up.

The chief advantage claimed for the Beaver Feed Thru Switch is that its mechanism can be removed from the casing, connected and replaced after connections are made, easier and quicker than any other switch of a similar character ever designed.

Illustrated folders describing these devices in detail, together with prices, are ready for distribution.

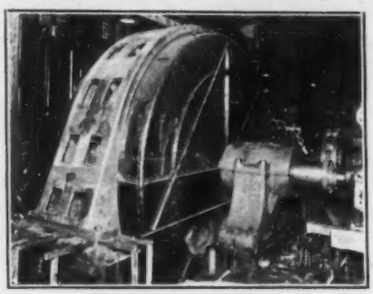
INSULATION AND ITS APPLICATION TO HEAT TREATING FURNACES

The increasing cost of fuels has forced attention to every process and method by which it may be possible to economize in the consumption of fuels. The most important step for the conservation of fuel is to insulate the space being heated. E. F. Davis of the Celite Products Co. has published a paper on this subject in the Transactions of the American Society for Steel Treating which is being reprinted for distribution by the Celite Products Co. The subject is thoroughly covered and contains valuable data on insulation, showing particularly the advantage of Sil-O-Cel insulation for high temperature equipment.

GENERAL ELECTRIC COMPANY BUILDS GIANT GENERATOR

The General Electric Company has recently completed the largest horizontal water wheel driven generator ever built by it. The machine is one of two being built for the Great Western Power Company of California, and will be installed in the Big Meadows plant on Feather river. It is a three-phase, 60-cycle machine, rated 22,222 kva., 0.9 power factor, 11,000 volts, 171 r.p.m.

The fact that it was built to operate on a 165,000-volt transmission line, the highest operating voltage to be reached so far in this country, caused some interesting features to be incorporated in its construction. It was designed with special reference to line charging requirements so that with full load armature current, the transmission line voltage will not build up to over 80% of the normal voltage. Silicon steel was used in the construction of the armature, to minimize core loss. Tests made at the factory on the generator show that it has 97.25% efficiency at full load, and unusually high efficiency at partial loads. These are 95% at half load, and 93% at quarter load. All efficiencies were at 0.9 power factor.



Horizontal water wheel driven generator rated at 22,222 kva., 0.9 power factor, set up for test in the General Electric shops. This is one of two being built for the Great Western Power Co.

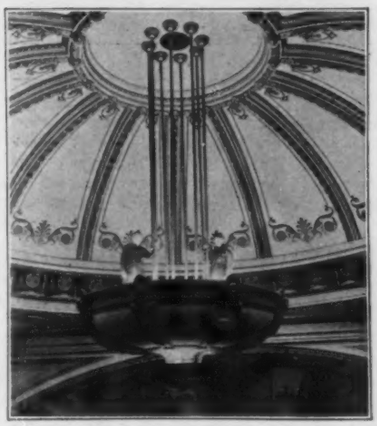
The rotor consists of four separate wheels made into a single spider, with rim dovetailed to receive the poles. The machine is enclosed for ventilation, having air inlets on each side, consisting of ducts coming from underneath. The heated air is expelled into the room. Some of the dimensions are as follows: total height over all, 21 ft.; distance over the end shields, about 7 ft.; distance from the floor line to the top of the machine, 13 ft. The total net weight is 334,000 pounds.

The illustration shows the machine as set up for testing at the factory. The intake ventilation ducts are not assembled, but the openings can be seen under the bearing. The projection of the armature shaft is for the applica-

tion of the water wheel, of which there are two, one on each end of the shaft.

LARGEST INDIRECT LIGHTING FIXTURE EVER BUILT

The largest indirect fixture ever built has recently been installed by the National X-Ray Reflector Company, in the Alhambra Theatre, Milwaukee. This enormous indirect unit is fifteen feet in



Large Indirect Lighting Unit

diameter and contains 118 lamps; the main bowl containing 100 200-watt Mazda "C" lamps in X-Ray Reflectors, and the lower bowl containing 18 60-watt lamps, the latter serving to light the large bowl and to be used in emergencies:

The fixture is suspended by eight two-inch pipes twenty-five feet long and hangs in the center of the dome over the auditorium of the theater. It weighs approximately 5500 pounds and is finished in ivory and gold.

PRESSURE-OPERATED SWITCH OF UNUSUALLY COMPACT DESIGN

A pressure regulator of the diaphragm type, which has recently been developed by The Cutler-Hammer Mfg. Company of Milwaukee, Wisconsin, is much more compact and simpler in design than the other C-H diaphragm type regulators. This new device which is known as Bulletin 10004, is arranged for easy mounting, and its three overall dimensions are 6, 6½ and 8 inches. It is used with motor-driven pumps or compressors controlled by a main line magnet switch or some other suitable automatic starting device. It has two poles, which enables it to be used also for connecting small a.c. and d.c. motors directly to the line.

The air, water, or other fluid under pressure is conducted into a chamber in the base of the regulator ,and the pressure acts against a rubber diaphragm and compresses a spiral spring, the normal compression of which can be changed by means of an adjusting nut, to obtain various values of opening pressures up to 60 lbs. per sq. inch. When the switch is closed and the pump or compressor operating, the pressure builds up, and when the adjusting spring has been compressed to a certain point, the switch snaps open and stops the motor. When the pressure has fallen to a predetermined point, the switch closes with a quick action, and the pump or compressor again operates to build up the pressure system.

This snappy make-and-break action of the switch is accomplished by an arm carrying a roller which is held in tension against a cam mounted on the operating shaft of the switch. The movement of the adjusting spring is transmitted to the roller which moves along the surface of the cam. When the opening or closing pressure is reached, the roller passes a peak on the cam, and gives the latter a quick turn, thereby opening or closing the switch. A good contact pressure is maintained up to the instant the switch is opened. The difference between opening and closing pressure is about 20 lbs.

The entire mechanism of the regulator is enclosed in a cast iron case arranged for the entrance of conduit. Terminals and fingers are exposed by taking off the cover of the case, which necessitates only the removal of three screws.

The regulators are at present made for 60 lbs. maximum service, and it is expected that they will shortly be provided for use on systems up to 200 lbs. pressure with few slight modifications in design.

Books and Bulletins

Static Condensers

In order to overcome the detrimental effect of a low power-factor for comparatively small loads, the General Electric Company has developed a stationary or static type of condenser, which is described in Bulletin No. 49714C, "Static Condensers," superseding Bulletin No. 49714B. This type of condenser does not require an attendant for its operation, and therefore may be installed in any out-of-the-way space or in a substation receiving only monthly inspection.

The bulletin points out that the static condenser is an extremely efficient device. The losses in the 2300-volt equipment are only ½ per cent of the rated kva. capacity. The losses in the low voltage equipments are increased to 3 per cent, due to the auto transformers.

A number of curve charts, diagrams of connections, drawings and tables on prices, dimensions, losses and weights in the case of condensers, circuit breakers and transformers are provided. The bulletin is well illustrated and includes a number of photographs of actual installations.

High Speed Induction Motors and Frequency Changers

Motor speeds as high as 25,000 r.p.m. are now practicable for obtaining increased production and operating efficiency, according to Bulletin No. 41521A, superseding Bulletin No. 41521, issued by the General Electric Company. This bulletin is entitled "High Speed Induction Motors and Frequency Changers."

Practically every industry has use for these equipments, and many types of manufacturing plants where they are in use are cited by the bulletin, such as plants producing airplanes, car bodies, automobile bodies, furniture, phonograph cabinets, roller and ball bearings.

The use of the high speed motor has been rendered feasible by the development of the induction frequency changer. The cost of the device is nominal and its operation automatic, no special attendant being necessary. Belts are eliminated, thereby reducing the first cost, upkeep and loss of production due to belt slip.

It is also often feasible to install two or more motors on a single machine, thus saving gearing and belting. The standard motors are two-pole, and are wound in two series—the first rated normally at 120 cycles, 220 volts, and designed to operate from 100 to 199 cycles; the second series normally rated at 200 cycles, 110 volts, and to operate through a range from 200 to 300 cycles.

The bulletin goes into detailed descriptions of the installation of these motors on various types of machines, showing illustrations in each case. There are also tables and drawings of dimensions, ratings and methods of ventilation. Data is given on induction frequency changers and on control devices.

Laundryette Manufacturing Company Announces Sales Bulletin

The Laundryette Manufacturing Company, makers of the Laun-Dry-Ette, announce the recent publication of the first number of their new sales bulletin known as the DRYer.

This little bear of advertising and selling ideas will be sent from time to time to each Laun-Dry-Ette dealer. It is a multigraphed affair and takes its name from the dryer, a built-in device on the Laun-Dry-Ette Electric Washing Machine, which enables the user to entirely dispense with a wringer.

The dryer whirls the wet clothes wringer-dry in one minute without handling or loss of buttons.

Westinghouse Lamp Adds New Magazine

A new monthly house magazine, "Light Touches," is scheduled by the Westinghouse Lamp Company to make its appearance some time during the first ten days of April. Within its sixteen pages the company purposes to deal with the activities of its "A" and "B" agents, and its lighting service and engineering activities. It will be technical to only a slight degree—one article an issue—and will replace "Commercial Engineering News," which until March 1st was the semi-technical house magazine. Articles of interest to dealers and jobbers will take up the remainder of the section.

National Electrical Safety Code

A third edition of the National Electrical Safety Code prepared by the Bureau of Standards, Department of Commerce, Washington, has been issued and is known as Handbook No. 3 of the Bureau of Standards.

The National Electrical Safety Code has been developed with the cooperation of representatives of all branches of the industry and the previous edition has become widely known as Circular No. 54. This Code consists of four main parts dealing respectively with (1) the installation and maintenance of electrical supply stations and sub-stations; (2) the installation and maintenance of overhead and underground supply and signal lines; (3) the installation and maintenance of utilization equipment; (4) rules for the operation of equipment and lines; and supplementary sections which include rules for protective grounding of equipment and circuits.

NEW ELECTRICAL and INDUSTRIAL DEVELOPMENTS

(A contract for 200 airplanes awarded Seattle firm; new barrel plant for Vancouver, Wash.; Oakland to have new factory loft building; South San Francisco locomotive boiler shops placed in commission; demand for Portland cement keeps southwestern plants busy; Intermountain district reports activity in power development, indicating industrial activity throughout the West. —The Editor.)

THE PACIFIC NORTHWEST

SEATTLE, WASH. — The Boeing Airplane Company of Seattle, according to reports from Washington, has been awarded a contract for 200 airplanes.

TACOMA, WASH.—The city council of Tacoma is planning the installation of an ornamental street lighting system, affecting streets from 8th to 17th Streets.

THE DALLES, ORE.—Early construction of the $125,000 municipal auditorium, bonds for which were voted by the people of The Dalles last summer, was decided upon by the committee in charge.

EVERETT, WASH.—The Mill A of the Weyerhaeuser Lumber Company here will immediately be equipped for electrical operation. The installation will consist of electric turbines and motors. The equipment has been purchased.

PORTLAND, ORE.—Plans for the $100,000, T. B. Wilcox memorial hospital to be erected on a 100 x 100-ft. plot of ground adjoining the Good Samaritan hospital have been filed with the city bureau of buildings. The structure will be a three-story fire-prof building.

PRESCOTT, ORE.—The Beaver Lumber Co. of this place has just completed the installation of a 150-hp. motor to drive a machine for grinding up mill refuse into hog fuel. Power is being supplied by the North Coast Power Co. and the hog fuel is being supplied to the port of Portland.

SEATTLE, WASH.—The Seattle School Board has made plans to spend $3,500,000 in new school buildings and additions to present grade school structures during 1921. A call for bids on the largest of the school structures, the Roosevelt School, has been issued. This building will cost $1,200,000.

VICTORIA, B. C.—The plant and property of the Howe Sound Mining & Smelting Company at Brittania Beach, 25 miles from Vancouver, was recently destroyed by fire, caused by a short circuit. The electric power plant, compressor plant, and machine shop were saved. The loss is placed at $750,000.

BANDON, ORE.—Mayor George P. Topping has filed with State Engineer Percy A. Cupper an application for the appropriation of ten second-feet of water from Willow Creek for a municipal power plant. It is proposed to develop 795 horsepower. The power plant will be located a short distance south of Bandon, and the development will cost approximately $100,000.

VANCOUVER, WASH.—It is reported that material has been shipped and construction will begin immediately on the immense new plant of the Calidornia Barrel, to be built on a site below the Standifer shipyard, acquired by the company for the purpose. The first unit will be complete by August, according to the present plans. The plant will be electrically operated throughout.

TACOMA, WASH.—The construction of the proposed light and water department building, to be built by the municipal lighting department, is proceeding by day labor. All bids received for the erection were in excess of the $90,000 appropriation and were rejected. The structure will be two stories, fire-proof, 200 by 100 feet, located on Hood Street, between 24th and 25th Streets.

SEATTLE, WASH.—The Western Washington Land Development Company, Seattle, James Campbell of the Campbell Lumber Company, William M. Beatty and J. E. Hoskins, all of Seattle, are to clear logged off land on a large scale and sell the land to ranchers. The concern is capitalized at $500,000, and will develop the ground immediately, with installation of stump-pulling machinery and other equipment.

SEATTLE, WASH.—W. M. Moran & Co., Seattle, recently petitioned the Port of Seattle Commission for a lease on property at Salmon Bay, where the company contemplates starting a lumber manufacturing plant. The manufacturing plant anticipated by the company will utilize some logs for the manufacture of lumber, and will be a radical departure from the ordinary sawmill in that considerable waste material from other mills would also be utilized. The proposed plant will be operated electrically.

SEATTLE, WASH.—The plant of the Zimmerman-Degen Shoe Company, Seattle, at Wallingford and Ewing Avenues, has suspended operations, and the entire plant, including building and equipment, is offered for sale. The factory proper is a two-story structure, 228 by 40 feet, concrete and mill construction. The company, when in operation, specializes in men's work and dress shoes, employing 75 people and having a daily capacity of 1,000 pairs of shoes. The plant was established in Seattle in 1912 by Charles Degen, owner and manager.

YAKIMA, WASH.—Work on the $2,500,000 Rimrock impounding dam near the headquarters of the Tieton river has been resumed by the U. S. Reclamation Service. Building of the dam, which is intended to create a gigantic new storage basin for the irrigation of Yakima Valley lands, was begun about five years ago. but suspended upon the entry of the United States into the war. It is reported the Government plans the expenditure of $750,000 on the project during the year and that before May 30th, 700 men will be employed on the work. F. T. Growe is supervising engineer on the job.

SPOKANE, WASH.—The Granby Consolidated Mining and Smelting Company, in which Jay P. Graves is heavily interested, owns the power site at Kettle Falls, on the Columbia river, in Stevens county, now being surveyed as to power possibilities by the Washington Water Power Company. The Granby company acquired the site 16 years ago, but took no steps toward its development. The survey is in charge of Grant Smith & Company, under the supervision of the engineering department of the Washington Water Power Company. The site is being surveyed from all angles, together with the cost of building a railway for the transportation of materials.

SPOKANE, WASH.—Examination of three proposed dam sites on the Columbia river considered in connection with the Columbia basin irrigation project, is to start shortly. Arrangements were completed at a conference with Director Davis of the United States Reclamation Service attended by Fred A. Adams, supervisor of the project; Arthur J. Turner, chief engineer; E. F. Blaine of Seattle and James Ford, representing the Spokane Chamber of Commerce. Director Davis authorized Supervisor Adams to call into the consultation without delay D. C. Henry, consulting engineer of the Reclamation Service.

THE PACIFIC CENTRAL DISTRICT

KEELER, CAL.—Thomas Skinner, formerly superintendent of the Chemical Production Company, is perfecting the organization of a new company to take it over.

SEARLES LAKE, CAL.—Operations of the West End Chemical Company and American Trona Corporation continue normal, despite earlier rumors of curtailment.

MODESTO, CAL.—At a meeting of the directors of the Modesto irrigation district it was decided to immediately advertise the balance of Don Pedro bonds, amounting to $1,015,000. The district already has sold $165,000 of Don Pedro bonds.

OROVILLE, CAL.—The Great Western Power Company will be asked to submit a figure for which they will furnish water to the Honcut-Yuba irrigation district, according to a decision reached at a meeting of the board of trustees of the district.

RICHMOND, CAL. — The city council has awarded contracts for the substructure of the new municipal warehouse. Hannah Brothers of San Francisco received the contract for driving piles at $35,577, and the contract for the concrete floor was awarded to Matthew Morton for $45,917.

SUTTER CREEK, CAL.—Installation of an electrically driven hoist and steel headframe at the Central Eureka mine is under consideration by the directors. The management has decided to repair and straighten the shaft and to use larger skips. Several other improvements about the property are contemplated.

RED BLUFF, CAL. — Northern California Wool Warehouse Company of Red Bluff, Tehama county, has asked the authority of the Railroad Commission to issue $25,000 of stock. It is planned to issue $12,500 worth of stock at once to secure funds for immediate operative needs. The stock is to be sold only to wool growers.

FRESNO, CAL.—The California Associated Raisin Company's contract drive has closed with 12,131 contracts signed up, covering 12,914 ranches. This brings in 1167 more contracts and 1,950 more ranches than were included on the old basis. A fraction over 92 per cent of the raisin growers are now signed. Outstanding contracts will be received up to April 16.

MARYSVILLE, CAL.—Application has been filed with the Federal Government by the Yuba Development Company for an extensive power project in Yuba, Sierra and Nevada counties. The first system includes ten reservoirs with dams 20 to 140 feet high, storing 43,200 acre-feet, and two conduits seven and a half miles long. The power house will develop 18,575 horsepower.

TURLOCK, CAL.—An unexpected offer and demand was made on the Turlock irrigation district by W. A. Kraner of San Francisco, one of the contractors competing for the right to build the Don Pedro project, when Kraner offered to take all of the remaining bonds of this district, $2,310,000 worth, at par and accrued interest, and requested that they be turned over to him forthwith.

EUREKA, CAL.—The work of installing the new compressor at the Tintic Standard mine at Dividend has been started and the work of

laying the foundation is now well under way. This compressor is to be the largest one in use in this camp and as soon as it is installed work on the new No. 3 shaft will be started. None of the old machinery will be taken out. The new compressor is being installed to meet the increased demand for air underground.

OAKLAND, CAL.—The erection of a factory loft building to afford accommodation for a number of individual industries and provide facilities found only in largest plants as planned for early construction by the Parr Terminal on the Oakland western water front is meeting with approval, according to officers of the company. The first unit to be constructed will be a section of six floors, with 20,875 square feet per floor. The estimated cost is $250,000.

SALINAS, CAL.—Anderson & Doyle have just completed the electrical work on the California Orchard Company's 900-horsepower pumping system at King City. This puts into action one of the largest and most complete irrigation systems in the Salinas valley. With a battery of four 16-inch wells manned by 11 stage direct drive pumps, propelled by 150-horsepower motors, this plant produces approximately 10,000 gallons per minute and distributes the water through an underground concrete system.

VALLEJO, CAL.—The officers of the Machinery Division of the Mare Island Navy Yard have been advised by a communication from the Navy Department that the yard has been selected as the Pacific Coast manufacturing station for gasoline engine parts. Heretofore all parts for marine gas engines have been made at the Norfolk Navy Yard and have been shipped to the west coast. This has resulted in many delays which have been obnoxious to members of the Pacific Fleet. The stock of parts which will now be made and kept to standard at Mare Island will approximate $66,000 in value.

OROVILLE, CAL.—According to word received here, the Western Pacific Railroad Company has awarded to Tuohy Brothers of Daly City the contract for the construction of a standard-gauge railroad from Bidwell, on the main line, to Bidwell Bar, on the Middle Fork of the Feather river. The line contracted for is five miles in length. From that point the logging railroad into the timber holdings of the Hutchinson Lumber Company is to be built by the lumber concern. Logs will be hauled to Oroville, where the company is soon to build a mill. Work upon the five-mile strip of railroad is expected to be commenced immediately.

FRESNO, CAL.—Cooperative marketing of the large hold-over crop of cotton in the San Joaquin valley received a boost on March 29, when representative growers of the valley met under the auspices of Fresno County Chamber of Commerce. A further meeting, at Bakersfield on April 5, arranged for the grading of all cotton now held in the valley gins. Reliable estimates are that ten thousand bales of cotton valued at between two and three millions of dollars remain for disposal. Belief is that the market will improve materially during the next few months, and owners are being asked to refrain from selling just now at prices below cost of production.

SAN FRANCISCO, CAL.—The placing in service of the new locomotive boiler shops at Bay Shore, South San Francisco, announced by the Southern Pacific Company, completes the general plan for the Bay Shore shops, and provides facilities for the taking care of all engines on the Coast Division and helping out the Western Division shops. The new boiler shop, a frame structure with outside walls practically all of glass, is 100 by 178 feet in size, with eight tracks and a capacity of six fire boxes a month. The large amount of glass used in the construction of the building provides excellent lighting and the fact that one side of the building is made up of sliding doors is an additional convenience to the work.

THE PACIFIC SOUTHWEST

PERRIS, CAL.—The Perris cotton gin has closed its first season, having turned out 374 bales of Durango cotton.

BLYTHE, CAL.—A new mining company has started operations on the Arizona side of the river, and contemplates electrical installations calling for 750 hp.

SAN BERNARDINO, CAL.—Water rights in Devils Canyon have been purchased by the city of San Bernardino, and an elaborate development is contemplated.

EL CENTRO, CAL.—J. A. Harris, who has been operating a number of cotton gins in the Coachella Valley, is reported as planning immediate erection of an oil mill in the Imperial Valley, probably at El Centro.

VICTORVILLE, CAL.—Southwestern Portland Cement Company is shipping an average of 2,000 barrels per day, or nearly capacity. Golden State Cement Company's shipments since March 1st have increased 25 per cent, and the demand is declared by both companies to be the best ever known at this time of the year.

RIVERSIDE, CAL.—For the year 1920 the Southern Sierras Power Company, operating in Riverside, San Bernardino county, Corona, Perris, San Jacinto, Hemet, Elsinore, Rialto, Blythe and Victorville, reports to the State Railroad Commission that its operating revenue was $1,861,735.14; its operating expenses, $742,927.47, giving a net operating revenue of $1,136,807.66.

VENTURA, CAL.—The Southern California Edison Company has been authorized by the Railroad Commission to exercise the privileges of a franchise granted by the trustees of the city of Santa Paula. The franchise cost $250, according to the application filed by the company. It is for a term of 50 years and provides that during that period the company shall pay to the city two per cent of the gross annual receipts from the date of the granting of the franchise.

LOS ANGELES, CAL.—The Harbor Commissioners are urging the city council to place before the voters a bond issue for at least $4,800,000 for the development of Los Angeles harbor, owing to the tremendous increase of commerce necessitating additional equipment, etc. The council will refer the harbor report to a special committee which is handling all bond issues which have been urged for places on the ballot. There will be no bond issues on the May 3 primary election ballot.

BALDWIN LAKE, CAL.—Gold Mountain Mine, near Baldwin Lake, which suspended operations some time ago, will resume as soon as a 25-mile power line can be constructed from the Apple Valley line of the Southern Sierras Power Company, contracts having been entered into with the latter by Manager James Hulme, who, with Oakland capitalists, is owner of the property. Gold Mountain, an immense body of free milling low grade ore, was originally located by "Lucky" Baldwin. A 40-stamp mill, two No. 3 gyrating crushers, and an air compressor constitute the outfit, hitherto run by a 150-hp. steam engine and 20-hp. gas engine. The line will be 33,000 volts, served by the Victorville substation, and a 150-hp. motor will be installed.

THE INTERMOUNTAIN DISTRICT

TONOPAH, NEV.—A bill authorizing the sale of "Mineral County Light and Power Bonds" for the purchase of the Hawthorne line of the Nevada-California Power Company, and construction of additional power lines by Mineral county, has passed both houses of the Nevada legislature, and been signed by the governor. Bonds are being prepared for sale, and surveys for additional construction will be started at once and pushed to completion.

NAMPA, IDA.—Permit for a $50,000 addition to the local icing station of the Pacific Fruit Express Company has been issued. The building will be 100 by 80 feet, of reinforced concrete construction, four stories high.

GREEN RIVER, UTAH.—The town of Green River will hold a special election on April 24 to vote on the proposition of selling the municipal electric lighting plant. It is understood that the city has received several good offers for the purchase of the plant.

SALT LAKE CITY, UTAH.—The Telluride Power Company has applied to the state engineer of Utah for the use of twelve second-feet of water from Panguitch creek, in Garfield county, to be used in developing 200 horsepower of electric energy, with which to serve the town of Panguitch. The application stated that a head of 267 feet would be developed.

CHEYENNE, WYO.—Plans for the first big water power project in Wyoming were made on March 25 following the filing of an application by William Kyne of Casper, Wyoming, for permission to erect a transmission line from Boysen dam to Casper, 130 miles. The project will cost $350,000, it is estimated. The hearing before the State Public Utilities Commission will be held April 13.

SALT LAKE CITY, UTAH.—As a result of some changes in general improvement district laws, which changes were made by the last legislature, it will now be possible to spread the payments for Whiteway lighting districts over a period of ten years instead of having the maximum period three years as heretofore. It is expected that this will promote a great deal of boulevard and residence street lighting.

IDAHO FALLS, IDA.—Two new 500-kw. units, to replace the two old 300-kw. units, are likely to be installed in the municipal power plant here, as a result of a conference recently held between members of the city council and representatives of local electrical houses. The city electrician has been instructed to communicate with manufacturing concerns relative to equipment that will fulfil the requirements. It is proposed to finance the proposition by paying the first payment out of the present city funds, and monthly payments thereafter from earnings of the plant. No bond issue will be necessary, according to present calculations.

SALT LAKE CITY, UTAH.—The Sevier River Land & Water Company of Lynndyl, Utah, has made application to the state engineer for 200 second-feet of water from the Sevier river, to be used for furnishing electric energy to Lynndyl and Eureka, Utah, and the country in that section. The company states that it is its intention to build a dam, headgate, measuring device, spillway, canal, pipe line and conduits, the canal to be 67,000 feet in length, with a width at the top of forty-five feet and twenty at the bottom. It is also their intention, they state, to install three turbine wheels of six feet diameter. They expect to develop about 3,000 horsepowr.

BRIGHAM CITY, UTAH.—At a special meeting of the city council on March 28 the contracts to install a new municipal electric light and power plant were awarded. Gray & Murdock, of Salt Lake City, were awarded the contract covering redwood stave pipe line, cement intake, cement and brick power house, and the setting of machinery in the power house. Their bid was $95,387.24. The Westinghouse Electric & Manufacturing Company was awarded the contract to furnish the electrical equipment, for $15,695, and also the contract for the installation of the electric and hydraulic equipment, including the switchboard, for $2,498 plus the bond in each case. The grade for the pipe line, which will be entirely exposed and laid on wood saddles so that the earth will not come in contact with it at any point, has been completed, and it is expected that the entire job will be completed by August.

STATISTICS

[We find so many of these that we have decided to inaugurate a regular department to accommodate them.]

A four-foot wide board sidewalk from the earth to the moon could be made every year from the lumber cut in the western part of Oregon and Washington. At the end of the second year, therefore, it would be possible to make the trip by automobile, provided the driver had a steady eye.

If all the copies of the Sunday edition of a certain daily newspaper were opened out and placed end to end, they would extend clear around the world, with enough left over to reach from the north pole to the south. In a year the earth could be entirely wrapped up in newspapers.

* * *

A new use for electric light was suggested to us by the following passage on the illumination of the home:

"Light is the most expressive medium we have for producing various moods. The lighting artist possesses primary light which has greater possibilities than reflected light, and the overwhelming advantage of a mobile medium. By the pressure of a switch he can redistribute and tint the light to produce another mood in a room."

We are going to have our living room completely rewired, with a system of various colored lights, and a dozen or so push-buttons located in an inconspicuous corner near our favorite chair. When arguments grow too heated we shall quietly press a button, switching on the moonlight effect and completely changing the mood of the room. When some of our spiritualistically-minded friends get too astral and misty in their conversation, we shall switch on a vivid materialistic red, and make the room look like—make it look warm and cheerful, that is.

The work from which we quote the above goes on to say:

"In light we have a powerful ally in subduing monotony."

That is another happy thought. We have a friend who will talk for three consecutive hours on the Single Tax, and no one can de-rail him. We shall try the lighting system. After fifteen minutes of Single Tax we shall throw on a blue indirect light, followed in rapid succession by a red direct light, and a violet spotlight and a green intermittent light. We think our friend may probably change the tone of his voice.

* * *

Our international news is nothing if not baffling. The following item from an Irish report left us a trifle mixed:

"Recently a prominent lawyer was aroused from his sleep by a commotion at the front door. He investigated and met half a dozen men in the hall, clad in civilian clothes. He fell dying from a half-dozen bullets. A group of men approached, dragged him from his seat into the lobby and shot him. The bullet miraculously glanced from his ribs and instead inflicted only a minor wound in the chest."

The first group of assassins had a bullet apiece, apparently, while the second only had one between them. Perhaps this accounts for the peculiar uncertainty of the results.

A commercial report says that there is a market for internal combustion engines in Poland. Personally we should have thought that Poland's thirst for all types of internal combustion was satisfied by now.

* * *

ELECTRICAL HYBRIDS — SERIES II.

I. The Electric Motoreador

Behold the Motoreador!
No doubt you have seen him before,
For he's proud of his power
And revolves by the hour
In one little spot on the floor.

Though he looks much too stiff to begin it,
When he runs in a race he can win it
With ease, and, moreover,
Turn over and over
Making x revolutions per minute.

He has more than the average pull,
For he's expert at throwing the bull,
And since his friends know
He'll make anything go,
His days are unusually full.